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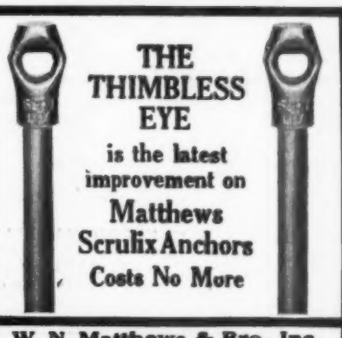
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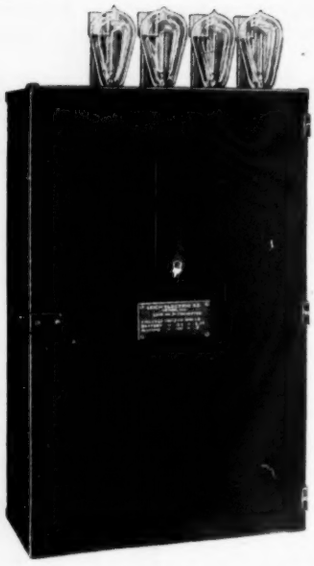

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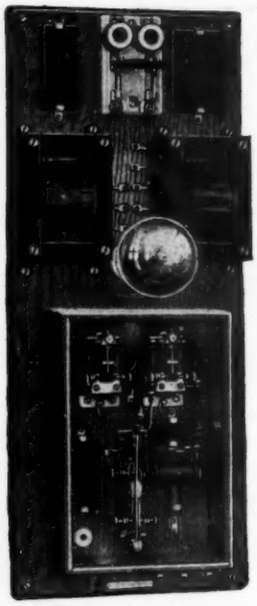

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Telephony.

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CURRENT OPINIONS AND COMMENTS

"Where is the capital of the United States?" asks a writer in the Wall Street Journal, which sounds like a question to the geography class, but it isn't. The answer given is: "Largely in tax-exempt bonds?"—and it is a painfully true answer as well as a witty one.

Money—that is, capital—needed by business, by public service corporations, by all industrial concerns with a chance to grow, continues to flow into state, municipal, school district, good roads' projects, and other government enterprises where the investor can escape a tax on his income, and to just that extent reviving business is hampered and retarded.

The resolution in Congress to restrict the issuance of tax-free securities, although strongly endorsed by President Harding and Secretary Mellon, seems to have struck a snag.

* * * *

The utility interests of the country should explode sufficient propaganda dynamite to free the passage and permit the measure to get out into the open so it will have a chance for its life.

Big capitalists will not help, but the rank and file of tax-payers, the army of business men, have the votes and the political influence to compel favorable action. They should make some organized effort that would help every industry needing money and lighten their own tax burdens.

* * * *

There isn't so much "bunk" in the idea of coöperation in business—the golden rule, "live and let live"—as some hard-boiled captains of industry have some times tried to argue after all. Seymour L. Cromwell, president of the New York Stock Exchange, was discussing Wall street methods recently, and said some interesting things about competition.

His idea is that we are entering a new era of business in which we shall get a new concept of democracy—not the democracy meant by the political demagogue, but a democracy which means "the utmost opportunity for every unit in society."

* * * *

"The Sherman law has compelled groups to compete where competition was not only unnecessary but definitely harmful to the public interests," said President Cromwell. "We all believe in competition, but competition means that each competitor shall set a pace for the others.

"Competition which means that anyone shall not run as fast as he can, or that there shall be an utterly useless duplication of effort, is the greatest handicap under which American business is struggling today. Had business been allowed to develop, it would have retained competition, for business cannot get along without it."

* * * *

Most interesting is the reply Mr. Cromwell made to the question as to how big business is discovering the new vision of democracy in industry.

He answered: "Primarily in the discovery of one business principle which was almost utterly concealed before the war. That principle is that *business cannot succeed through inflicting injury upon a competitor.*

"You may compete for all you are worth against a man who is competing for all he is worth; and the more he competes the faster you will be compelled to go but once put him out of the running and you slacken your own pace. Before the war it was a common practice in American business to put hindrances, if possible, in the way of competitors; but the organizations which followed this practice soon found themselves becoming stagnant.

"Stagnation cannot bring prosperity. Monopolies growing out of such practices must soon die. The up-to-date manufacturers and the up-to-date business men now know that their own best interests lie in encouraging instead of killing competition."

* * * *

It is interesting to note how responsibility tames down the average radical and slows up his program. On the political stump the radical thinker proposes all sorts of "reforms" but the nearer he approaches the actual practice of his preaching, the more his fury abates. He realizes it is harder to practice than preach.

* * * *

R. B. Howell, the new senator from Nebraska, has been a strong advocate of public ownership of utilities. He was expected, therefore, to immediately begin work for government ownership of the railroads, but since his election he isn't quite so hot on the subject.

He admits now that the government is not ready to take over the roads and that

such an attempt would be a failure at this time. Instead, he suggests that only one line be tried at first, so if the scheme does not work out the others need not be disturbed.

The Nebraska senator has strong convictions against monopoly of any kind, however, and proposes to fight the Esch-Cummins transportation act affecting common carriers.

* * * *

Slowly but surely the idea is penetrating the newspaper editorial "dome" that public service companies usually get more kicks than are coming to them, and receive fewer compliments than they are justly entitled to. Listen to the Columbus (Ohio) Daily News as it bluntly says:

"We are carried by the railroads a hundred times and deposited on time on the dot at our destination, and we forget to 'urge.' Then something happens and a train is late and we miss a date. Immediately we begin to 'urge' the railway commission to cut off some sucker's head. The same is true with the telephone, electric light and all other public utilities.

"While we are getting 100 per cent service, we keep our mouths shut. Comes a breakdown and we want the newspapers to lambaste someone. We are great little 'urgers' at times."

* * * *

That is the sort of publicity which is helpful to a company rendering any kind of public service, for the citizen who reads it will be a little less likely to rage furiously the next time he has to wait for a telephone connection or a street car, swearing that the company should be put out of business.

The cultivation of the right understanding of utility problems by the press will hasten the day when the service companies will get a square deal from the public.

Gaining the Public's Friendship

Fundamentals of Developing Close Personal Touch Between Subscriber and Company—Public Must Be Educated, Company and Employes Perform Their Part—Paper Read at Syracuse Meeting, New York Up-State Association

Prepared by C. A. Spaulding
Division Commercial Manager
New York Telephone Co., Buffalo, N. Y.

Read by G. G. Harris
Attorney and Director
Wayne Telephone Co., Newark, N. Y.

The country and the times have progressed so that the old time bartering and the old time methods of buying and selling have become obsolete. Fifty years ago, people were not in a hurry. Speed as we know it today was unheard of. We had no telephones, no electric street railways, no automobiles, and what was called an express train would make us smile today. Correspondence was mainly carried on in longhand.

In the days when people walked or drove horses or moved in horse-drawn street cars, men and women had "more time" than they have now. They had time to purchase leisurely. Salesmanship had not become an art and competition in business, as we know it today, was decidedly not developed. There was no commerce between the states of the Union on a wide scale, because there were no quick communication and transportation. Neither were there large trusts or combinations in business.

It is conceivable that there must have been an old-fashioned courtesy and stilted manner of selling and transacting business. Public relations was not a crying need, at least as a slogan, because business was not large and small businesses are easily understood. But as quicker forms of communication and transportation were devised, commerce changed. It stretched out, broadened. Consolidation took place. Great combinations came into being.

It was not easy to understand big business and the close personal touch between the buying public and the owner of a business or store, was lost. People became suspicious of qualities and prices, when they had to deal with clerks instead of owners. They were taught to hate monopolies and trusts and combinations. The good were not separated from the bad, and speedily the necessity for public relations was recognized.

Today public relations is necessary to all merchants and to all corporations, and good public relations means more than selling a good, honest article at a fair price. It means selling something that can be purchased elsewhere in such a manner that the purchaser will return to the place of his original purchase, when he requires more goods, because he likes the people he bought from as well as the goods he purchased.

Confidence and friendship and support follow good public relations. It came to pass that railroads, telephone companies, the largest lines of business, recognized that none is too big or too powerful to ignore the necessity of cultivating the friendliness and the good-will of the public. No longer was money from the public in itself enough. It was necessary to acquire money and friendship.

ABILITY WILL FIND A WAY.

Ability is never stifled in its expression. In the most unfavorable conditions of employment it will find a way of making a mark. Where encouragement is given in industry, it makes it easier for the man who is different to come to the fore.—General W. W. Atterbury, vice-president, Pennsylvania Railroad Co.

It is easy to comprehend why this is so. The lawmakers were busy, the politicians were busy, the demagogue was busy, the soap box orator was busy. The people had become so feverishly busy because they had quick communication and quick transportation, that they were letting other people think for them. A man cried: "The telephone company is robbing you." They heard in passing. It did not occur to them that the man was expressing his opinion and not a fact. They believed, and when they believed, they hated. The legislators were quick to perceive this, and to be popular they attacked, sure of applause and votes.

Let us from now on confine ourselves to our own business. While we were constructing the plant, developing, learning the business, there seemed to be no time for public relations. As I look back upon my first year in the business, 1895, I understand now why we were not popular. At that time I could not.

There were a good many Independent telephone men and women before a single Independent telephone company was formed. Probably they did not mean to be so. They were thoughtless. In those days we had no telephone service, as we know it now, and very little of that broader service, that courteous service from the heart, which we have developed so rapidly in recent years. You may guess accurately what I mean.

Competition fanned fires of dissatisfaction into conflagrations of active hate. Some Bell exchanges were all but swept off the map. In this part of the state we did pretty well because by the grace of

God there was quite early developed some of the spirit of obligation to the public which we now have.

Nevertheless, our New York state companies were not popular, nor were we understood by the public. During the days of development and competition, while we were approaching the present high standards of plant construction and maintenance and operating service, we seemed to have our hands pretty well filled—but we were overlooking one of our great problems, to some extent at least.

We had to learn that, with the field to ourselves, with a good plant, a good development and a good service, we were in serious trouble constantly because we had not attracted the complete confidence of the public. Without that confidence, subscribers would not believe our rates fair, nor our service good. They questioned our integrity. It was popular to attack the system. Government ownership threatened, complaints were lodged with the public service commission on many subjects. The attitude of the public made operation expensive, and many of our people, instead of running the business smoothly, were handicapped by the necessity of defending the company in many ways.

Great progress has been made toward improved public relations, and this fact is now reflected in the friendly attitude of many of our customers toward us, particularly in the smaller communities. We have merely scratched the surface, however, in the larger places and we may well afford, nay, we must stop, to analyze this problem and keep it constantly before us.

Shall we define favorable public relations? It is very easy. The Golden Rule! That's all. "Do unto others as you would have others do unto you." In dealing with the public, first and always put yourself in the subscriber's place, *change places with him.* Treat him as you would want to be treated if you were the subscriber *and he the telephone man.*

It is easy to write, easy to say, but to my mind this is a profound truth—you can not foster right public relations until you have conquered yourself. You can not do this wonderful job until you have grown mentally, spiritually, philosophically and telephonically. You must achieve character, love your fellow-man and have a keen desire to serve him. You must absorb patience and eliminate self-congratulation. You must love your business. If you can not do what you like, like what you do. What most big men seek is greater power. A few still bigger seek to serve. Success is not a bequest; it is a conquest.

Let us begin from the bottom. There are some fundamental rules:

1. The employe must want every subscriber as a friend for himself and the company.

2. We can not start the public campaign until we all in every exchange and in every department make our own internal relations right.

3. We must all have a very general knowledge of the big things in our business, what the company is trying to accomplish, and how, as well as being experts in our own particular work in the system.

4. Public relations is the problem, not of the commercial people alone, but of every operator, of every plant man, of every single employe.

5. The employe who has not a *positive concern* for every feature of the subscriber's service, falls short in the specifications we feel he must fill.

Let us remember that we are in a peculiar business. A subscriber when using our goods works in the dark, and is a part manufacturer of the service, but unfortunately an unskilled workman; and in using our goods he is actuated by a desire to transfer his thoughts to another—a most personal and intimate function.

He can not see our machinery in operation, and when a man wants to transfer a thought nowadays, he wants to do it without delay. He can not see our effort to serve, when he is using the service. These are reasons why we, in the business, must make a greater effort to serve than is necessary in a business where the goods to be used are in plain sight, can be inspected, handled and compared.

And we are so big! It is hard to understand big and complex things—and people are suspicious of things they do not understand. We can not expect the subscriber to understand all about our business. The most we can expect to do is to make him understand the important parts, and to so impress him with our earnestness and our own personal service to him, that he will take the rest for granted.

So, referring to rule No. 1, if we can make a friend of him by our knowledge, our good nature, our service and our courtesy, he will judge the company by us and be its friend. Life is not so short that there is not plenty of time for courtesy, good nature, knowledge and service.

As to rule No. 2, it must be apparent what I mean. We must all be on terms of friendship and co-operation with our fellow workers. If there be jealousy of departments, jealousy among employes, harsh criticism, a lack of harmony, how can we win the public? We must be what we claim we are, members of a big family, full of charity toward one another, willing to overlook, and forgive what may seem to be a lack of consideration from others, full of pride in the progress and successes of all telephone workers, willing to give credit to others, and willing to accept good advice from any good telephone man or woman.

Sometimes, men say things which sound differently than they mean them. Sometimes, the manner of expression carries a wrong impression. We must understand the motive, and if the motive be good, overlook faults of expression and manner. How I detest a man who nourishes and preserves a grudge! Item. Always treat the telephone operator as one of your family. Help her intelligently, and as you would like to be treated if you were an operator.

Rule No. 3. We can not work with authority unless we know. Make way for the man who knows. Education must be constant. An honest mistake can be overlooked; ignorance on essentials is almost a prison offense in the telephone business.

Rule No. 4. Good public relations is founded, first, on good quality of service from the switchboards. We have that. After that, it can be fostered by the attitude of all employes. What an opportunity the repairman has when on the subscriber's premises! What a wonderful opportunity the commercial people have!

They are in face-to-face contact with the subscriber. He is in trouble. You can help. He wants information. You can give it. You can say, "What do you want?" (if you don't get caught at it) or, you can say, "Good morning. How can I serve you?" You can look disinterested, or bored, or you can look cordial, friendly and interested.

Have you ever reflected on your own feelings when you *are* interested in a subscriber's mission, and *when* you have cleared his troubles away? He thanks you, perhaps shakes hands with you, and goes about his business. Are you not glad and satisfied with yourself, because you have satisfied a man who, by paying telephone bills, helps to pay your salary? Of course you are.

There is happiness in giving a helpful service. Make every subscriber feel "What a fine man or woman that is in the telephone office." You have made a friend

WHAT YOUR WORK DOES.

We do not understand how any one can ever succeed while regarding work as an ordeal. If you do not like your work and cling to it, it would seem you were practicing an unconscious treachery towards yourself and your fellow man. The moment you don't like your work, that work becomes shameful; and where there is shame, there is degradation. And if you degrade yourself by doing something you intensely dislike, any success that may come from it must be a mockery.

By your work you should bring happiness and thought and information to the world. You should increase the love of one for another; destroy the primitive prejudices of one person against another who happens to live in a different place. Real work benefits your neighbor as much as yourself.—D. W. Griffith.

for yourself and for the company. You have promoted good public relations. You must feel what you say. It must come from the heart.

The operator must say her words from the heart. The plant man must say what he has to say from the heart; the commercial people must talk from the heart in all sincerity and earnestness; and when we all talk from the heart, we shall win our friends, the customers.

Each employe has to lay out his own public relations job. There can be no set phrases or sentences. Interest in the business and in the subscriber—concern for him if you will—will indicate what you have to do and how to do it. A public telephone collector can make friends or enemies for the company by the expression of his face or the way he says, "good morning."

I have convinced myself that the great majority of people want to be friendly with us, if we will give them the chance. Most people are all right. Human nature is good, almost always. But people will not like you unless they know you.

Public relations of the right kind can be accomplished by the telephone people going to the public and saying, "How do you do." It never can be accomplished if the public feel, when they come to us, they are coming to strangers. Most of all, it falls upon management and the commercial people to know their subscribers.

Suppose a new concern comes to town: A telephone is installed. Is that the end? Mr. Manager, you know better. Go to the owner of that concern, when you do not want something of him, and introduce yourself. Ask what you can do for him, if everything about the telephone is all right. Invite him to call upon you for help if anything goes wrong, urge him to visit the central office, make him feel at home and make him know the telephone people.

Will he be your friend and the company's? He will, and probably some time he can show his friendship.

Rule No. 5 deals with concern for a subscriber. A simple illustration will suffice. Suppose he tells you he has not a telephone directory. That is a big thing to him. It isn't so very interesting to you, is it? But it happens to be the biggest current thing in his telephone life, and you must treat it that way. You *must be concerned* about it, and let him know and feel you are.

Interest in his trouble and quick action, will earn his appreciation. Get the book to him at once. It is a good public relations work. He will say that you and the company are on the job. A careless, disinterested air and slow action, may sour that man permanently. And so, with anything the subscriber brings to the attention of any one.

Now, all these things and many more are necessary for proper public relations. Telephone satisfaction means more than satisfaction with the quality of switchboard service. It means satisfaction in dealing with the people in the telephone business—and when there is telephone satisfaction, there is friendliness. No corporation is so big and powerful that it can get along without the friendship of the people it serves. Unfriendly people will enact harmful laws, will attack rates, will prevent the smooth running of a business, and make the expenses greater. They make the job less happy and attractive.

I shall go further. We in the telephone business do not want employes who can not see the necessity of splendid public relations, or who will not do their full share in helping to attain them; but we do promote and encourage those employes who understand and do their share. They become leaders and bigger men and women, and happier.

There is a very high degree of understanding of the public relations problem in the western division, and the results accomplished here in the last few years have been splendid.

Your goal is: *Not one single unfriendly subscriber.* And until the goal is reached, the campaign will be with us.

SERVICE PLUS

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

An old, colored, Pullman porter, who had done his bit for humanity, died recently. He contributed to his fellowmen a service which will exist long after he is forgotten, a service which cannot be limited to a certain group or number of people, as any person who takes a train ride will be benefited by his contribution to humanity.

For many years he carried the baggage of thousands of travelers, always warning them to beware of the sharp corners of the vestibules. Frequently, however, these sharp corners were the cause of painful bruises as passengers were thrown against them by the lurchings of the train.

Because of his concern about this, an idea dawned in his mind which eventually caused those sharp corners to be replaced by round ones. A simple idea, we say. True enough, yet it remained for this old porter to remedy a difficulty which had been bothering travelers for many years.

Doubtless, the old porter will soon be forgotten, but the result of his idea will make traveling easier for us as long as there are trains to ride in.

As operators, we have countless opportunities daily for giving service. If we conscientiously perform our work, we shall give—as the old porter did —*Service Plus.*

Plans for Centralized European Telephone System

The French Ministry of Posts, Telegraphs, and Telephones plans to hold a conference in Paris within the next few months, at which the administrators of the telephone systems in all countries of western Europe and the Mediterranean borders will be present.

The idea, according to the London Times, is that of a long distance telephone system, furnishing direct communication to 13 countries—England, Belgium, Holland, France Switzerland, Italy, Spain, Portugal, Morocco, Algeria, Tunis, Tripoli, and Egypt—to be centralized in France.

Nearly all of these countries have telephonic communication of some kind with each other, but the facilities are very limited and are not developed as part of any general plan. England, of course, has a system of submarine telephone cables linking with France, Belgium, and Holland, and many of the other countries have direct lines between their own capitals and those of their neighbors.

Apparently, the French plan would provide a system of trunk lines between the principal cities of all the countries of southern and western Europe and those of northern Africa, the system being controlled and operated from a central office in France. After preliminary investigation and agreement on a working plan, the matter will probably be presented to the International Conference on Electrical Communications, which is expected to be held in Paris next year.

Illinois Bell Plans $100,000,000 Expenditures in Next Five Years.

An expansion program carrying an expenditure of $100,000,000 in the next five years will be carried out by the Illinois Bell Telephone Co., according to a New Year's announcement by W. R. Abbott, president of the company.

In the last year the company has spent $18,000,000 for new construction, Mr. Abbott said. The president also referred to the phenominal growth in telephony by pointing out that 50,000 new telephones were installed in Illinois, with 32,000 of these in Chicago. The city of Chicago is now being served by 637,500 telephones.

Telegraph and Telephone Circuits

Phantom Telephone and Combined Telegraph and Telephone Circuits Worked at Radio Frequencies—Simultaneous Transmission of Telegraph Signals and Speech—Paper Presented Before Institution of Electrical Engineers, England

By J. G. Hill

The problem of utilizing telegraph and telephone circuits to transmit two or more simultaneous electrical communications over one circuit without interference between them, has from an early date occupied the attention of those interested in telegraphy and telephony.

During the past few years a considerable development of some of the methods employed has taken place with far-reaching results; and the object of this paper is to review the present position of the subject so far as the simultaneous transmission of telegraph signals and speech, at normal frequencies, and of phantom telephone working at such frequencies are concerned.

In view of the very wide range of the problems involved it will be possible to deal only very briefly with them. The methods most generally employed to provide extra channels of telegraph or telephone communication may be classified under the following heads:

(1) The impedance or retardation method of combined telegraphy and telephony over the same wire or wires.

(2) The equipotential method of providing simultaneous channels of telegraphic and telephonic communication over the same wires, and the application of this method to the balancing of telephonic relayed circuits.

The impedance method of simultaneous telegraph and telephone working applied to single-wire working was first introduced by F. Van Rysselberghe, a Belgian

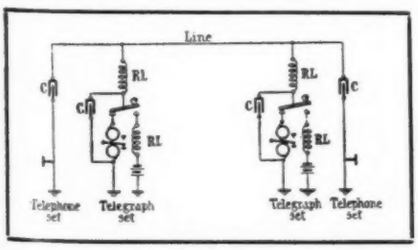


Fig. 1. The Van Rysselberghe System of Simultaneous Telephony and Telegraphy.

telegraph engineer, in 1882. Combined working is rendered possible by the different impedance of inductance coils and condensers respectively to high and low-frequency currents. The action depends upon the fundamental difference of telegraph Morse signals and telephone speech currents.

The voltages and currents produced in a telephone circuit by the voice are assumed to vary in a simple harmonic manner. The voice covers a wide range of frequencies varying, say, between 100 and 2,500 periods per second; the mean frequency for purposes of calculation is taken at 800 periods per second.

In the Morse code the signals consist of "dots" and "dashes." In hand signaling at the normal rate of 30 words per minute, a dot has a duration of 1/12th second and this will be used as a basis of comparison.

If an electric condenser of sufficient capacity (say 5 *mf.*) is placed in series with a telephone receiver in an ordinary telephone circuit, the attenuation of speech currents due to the condenser is so small as to be only just perceptible to the ear. The impedance of the condenser to very low-frequency currents is, however, very high.

On the other hand if a suitable inductive impedance be placed in the line lead of a telegraph set the speed of telegraph signaling is slowed down, but it is still possible to signal at hand speed on the telegraph circuit.

In addition to these direct actions in the telegraph and telephone circuit, and other direct actions which will be shortly described, the action of each circuit on the other requires consideration. The reduction in the rate of rise of the telegraph signals reduces the normal tendency of those signals to cause disturbance in the telephone apparatus via the condenser, in view of the simple fact that the disturbing signals vary in intensity in proportion to the rapidity of the rate of change of voltage at the terminals of the condenser.

The retarding device in the telegraph circuit, however, has a very high impedance to telephone speaking currents at the mean frequency of speech, and this high impedance acts beneficially as regards the transmission of speech, by reducing the transmission loss due to the telegraph apparatus acting as a shunt to speech currents. The disturbing effect of speech currents on ordinary Morse telegraphic apparatus is absolutely negligible.

The working of the Van Rysselberghe system depends fundamentally on the actions described. A high inductive impedance, *RL*, is placed in the path of the telegraph apparatus and a condenser, *C*, in the path of the telephone apparatus, the two sets of apparatus being joined in parallel and connected to the line as indicated in Fig. 1 in which both ends of the circuit are shown. A single-current circuit is shown for simplicity, but double-current working is generally used.

The foregoing description shows in a general way that combined telegraph and telephone working on the same wire is possible, but it is of interest to study more closely the effect of the inductive impedance and the condenser in order to find out to what extent (if any) the re-

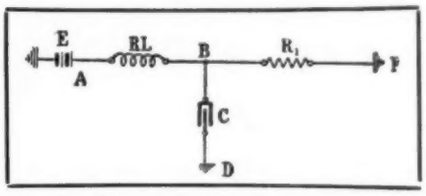


Fig. 2. Simple Circuit Having Inductive Impedance and Capacity.

tarded telegraph signals cause disturbance in the telephone set, and, further, how far the retardation affects the telegraph signals themselves as regards both shortening them and slowing down the rate of signalling. These matters will now be investigated.

In commercial combined telegraph and telephone circuits the apparatus arrangements are complex, as may be seen by inspection of the diagrams here given, and in addition the electrical action is materially complicated by the fact that the permeability of the iron cores and the effective resistances of the telegraph apparatus in circuit change materially with different current strengths.

For these reasons experiment is usually preferred to calculation in determining the best values of the inductance and capacity required. The fundamental theoretical effect of the devices introduced to control the rate of rise of the current may, however, be studied with advantage from the mathematical point of view in the relatively simple circuit shown in Fig. 2.

Let E=a constant applied voltage at *A*.
v=the voltage at the terminals of the condenser at the time *t*.
R=the resistance of the retardation coil.
L=the inductance in henries of the retardation coil.
R_1=the unvarying resistance of a long line supposed to be non-inductive.
C=the capacity of the condenser in farads.
t=the time in seconds after the application of the voltage *E* to the circuit.

Then the equation connecting the voltage *v* with the time during the transient period

when the E.M.F. is rising from zero to its steady value E, is

$$\frac{d^2v}{dt^2}+\left(\frac{R}{L}+\frac{1}{CR_1}\right)\frac{dv}{dt}+\left(\frac{R}{CLR_1}+\frac{1}{CL}\right)v=\frac{E}{CL} \quad \ldots\ldots(1)$$

The corresponding equation for the value of v at any instant t after the application of E, is

$$v=\frac{ER_1}{R+R_1}\left[\left(-\frac{1}{2}-\frac{\alpha}{2\beta}\right)e^{(-\alpha+\beta)t}+\left(\frac{\alpha}{2\beta}-\frac{1}{2}\right)e^{(-\alpha-\beta)t}+1\right] \ldots\ldots(2)$$

$$\alpha=\frac{1}{2}\left(\frac{R}{L}+\frac{1}{CR_1}\right)$$

$$\text{and } \beta=\frac{1}{2}\sqrt{\left[\left(\frac{R}{L}-\frac{1}{CR_1}\right)^2-\frac{4}{LC}\right]} \ldots(3)$$

If $R/L=1/CR_1$ and $R=R_1$, the equation for v may be written

$$v=\tfrac{1}{2}E[1-\sqrt{2}e^{-t/CR}\sin(t/CR+\tfrac{1}{4}\pi)]. \quad (4)$$

In any case if β is imaginary, the equation assumes a form similar to (4).

Examination of these equations shows that the rate of rise of the voltage is logarithmic, and that by arranging suitable values of R, L, C and R_1 the rate of rise of the voltage may be either advanced or retarded. If RL represents a relay at the receiving end of a line and C a condenser shunted by R_1 at the same point, we have the well-known arrangement of the shunted condenser as may be seen from Fig. 2.

Fig. 3 gives an oscillogram of the normal rise of current in an unshunted Wheatstone telegraph receiver, and Fig. 4 shows the more rapid rate of rise obtained by adding the shunted condenser to the same apparatus, the adjustment being made to produce a signal as nearly square (flat-topped) as possible.

On the other hand, in order to produce the retardation which is desired in a combined telegraph and telephone circuit, the following values which have been actually

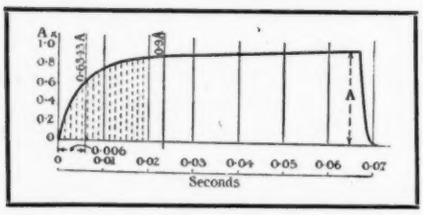


Fig. 3. Oscillogram of Normal Rise of Current in Unshunted Wheatstone Telegraph Receiver.

used may be taken as an example: $R=50$ ohms; $L=20$ henrys; and $C=5$ microfarads.

If the value of the line resistance R_1 be 500 ohms, the rate of rise is now greatly retarded as compared with Fig. 3. The variation of the voltage at the condenser terminals with time is shown in Fig. 5. It is evident from these examples that the values of R, L and C must be carefully chosen. It is further evident from the general equation (2) that in order to produce the least voltage at any instant, t, E must be as small as the satisfactory working of the telegraph circuit will permit.

It should also be noticed that although the value of R should be small in order to give a small time-constant yet the amount of v becomes less as R becomes greater, but of course the greater R may be unfavorable to the telegraph circuit.

Although the more complex apparatus arrangement shown in Fig. 1 causes the effects just described to be modified, experiment clearly demonstrates the fact that relatively large values of L and C give good results. It will now, however, be shown that it is not practicable by an arrangement such as that shown in Fig. 2 to eliminate entirely the disturbing effect of ordinary Morse signals in the telephone

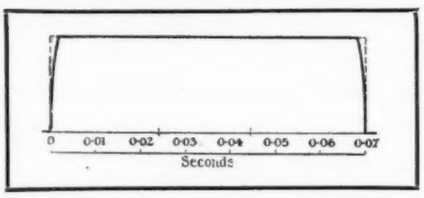


Fig. 4. Oscillogram of Current Rise When Shunted Condenser Is Added to Apparatus Used in Fig. 3.

circuit, due to the rate of change of voltage at the terminals of the condenser.

An examination of Fig. 5 shows that in the first 1/100 second after the application of the E.M.F., the volts have risen to 18 per cent of their final value, notwithstanding the heavy retardation, and such a rapid change of voltage would, with the voltages used in the ordinary Morse system, give rise to a click in the telephone receiver.

If this is compared with the rapid rise of an ordinary Morse signal, however, it is at once seen that the retardation which has just been examined has slowed down the signal considerably. Fig. 3 shows a record of a normal signal passed through a Wheatstone receiver at a speed of 18 words per minute. In this case, in the first 1/100 second the current has risen to about 0.75 of its full value, which is a much more rapid change than the case previously dealt with.

In order to see the effect of this changing current on the telephone apparatus, it should be noted that the telephone receiver has a marked sensitivity in the neighborhood of 800 to 1,000 periods per second.

If the maximum current passing through the Wheatstone receiver is 10 mA there is a rate of change of over 2 mA in the first 1/800 second (see Fig. 3) and it is known that a current of this magnitude will produce a pronounced click in a telephone receiver. The current attains 9/10ths of its maximum value after one-third of the full duration of the signal has elapsed. In the absence of combined telegraph and telephone working it is frequently necessary to increase the rate of rise of signals instead of retarding them, and the means of doing this have been dealt with.

It may be remarked that the retarding device RL in Fig. 1 does not protect the telephone superimposed apparatus in the same circuit from the disturbing effects of telegraph induction from contiguous uncomposited telegraph circuits.

Inductive disturbances from such circuits pass partly through the telephone apparatus owing to the fact that the retarding inductance is in the path of the telegraph apparatus only. On this account heavy induction from uncomposited contiguous telegraph circuits may affect the composited circuit. The remedy is to place retarding devices in the circuits which give rise to the disturbance.

Electric waves travel on unloaded aerial copper wires of small resistance with a speed approaching that of light, while in heavily-loaded underground circuits the speed may be reduced to 8,000 miles per second. The rate of telegraph working is largely influenced, however, by the electrical sensitivity of the apparatus employed, as well as its mechanical inertia, so that in practice the rate of working depends on the combined apparatus and line.

From another point of view it also depends on the technical nature of the serv-

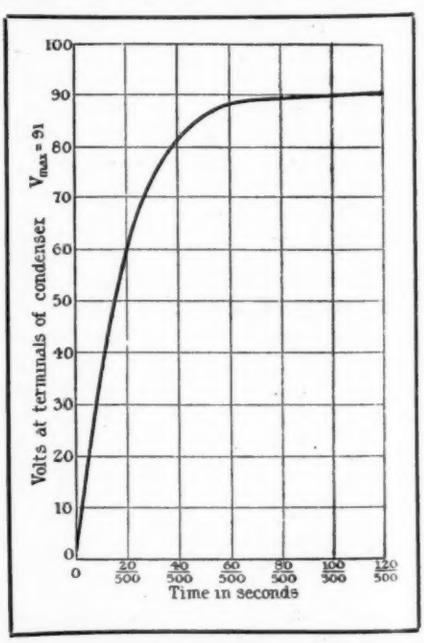


Fig. 5. Variation of Voltage at Condenser Terminals with the Time.

ice utilized. For example, in simplex working a higher all-round speed per channel is possible than in duplex working, and, again, a higher speed is obtainable per channel in duplex working than in quadruplex working. Further, it does not follow that the actual speed of trans-

mitting signals will give a proportionately economical result, for the question of the operator's time in preparing the message for transmission at the sending end and in preparing it for delivery at the receiving end enters into the matter, some sys-

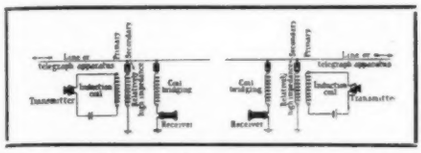


Fig. 6. One of Many Variations of the Van Rysselberghe Method.

tems involving more time for this than others.

For the purpose of the present problem, however, the rate of rise of each signal is of immediate importance. As an example, consider an aerial-line Morse Wheatstone circuit. It would be possible under the most favorable conditions to obtain a speed of 600 words per minute from this system, but it is preferred to work at a speed which can generally be maintained with ease under unfavorable conditions, and 200 words per minute is frequently found to be convenient; this is equivalent to 80 dots per second, so that a signal would last only 1/80th second.

Referring to Fig. 5, it will be seen that the voltage rises to only about one-third of its maximum value in that time and it would be impracticable to add a heavy retardation in such a circuit. In practice, with the amount of retardation necessary to reduce the noise in the telephone sufficiently for satisfactory working, and bearing in mind the necessity for keeping the voltage of the telegraph circuit as low as possible for the same reason, experiment shows that 60 words per minute on an overhead line working duplex can be obtained only under the most favorable conditions.

It should be mentioned in this connection that if too much inductance is used in the retarding device, the telegraph signals may stick and be sluggish. In order to provide a working margin of safety the Van Rysselberghe system is in fact, generally worked only at hand speed. If this is assumed, electrical filters may be used to cut off the currents of higher disturbing frequencies.

It may be pointed out that the introduction of the retarding device is further likely to cause difficulty in balancing telegraph duplex circuits, owing to the necessity of balancing in the compensation circuit of the duplex, the effects of the retardation added to the line. In order to minimize this difficulty it is found in practice that if the windings of the retardation coil are joined up so as to oppose each other, balancing is much easier, while the telephone circuit may still be worked. The best position for the retardation coil in duplex circuits is in the lead common to the line and compensation circuit.

In addition to the rate of rise of the current, telegraph signals have a periodicity, the wave form being generally of a complicated nature. A Morse signal has a low periodicity, and advantage may be taken of this fact so to tune anti-inductive apparatus as to eliminate or reduce inductive disturbance within a given band of frequencies, when the frequency of the disturbance is sufficiently high.

The foregoing facts show the limitations of the system of combined telegraphy and telephony just dealt with.

The ordinary magneto generator, which is of low frequency—about 17 periods per second—is liable to interfere with the telegraph apparatus, and for this reason telephone signaling at a higher frequency is desirable. The best frequency is one which is high enough to avoid interference with the telegraph apparatus, and at the same time is efficient for actuating the sensitive type of relay used.

The frequency which is found to be high enough for these purposes should not be exceeded, owing to the fact that high-frequency currents cause inductive disturbance to other circuits; actually, a frequency near 150 periods per second is found to be suitable. As a general rule, some form of interrupter or buzzer is used to generate the calling current on all types of composited circuits. Sometimes an interrupted direct current, actuated on the principle of the electric call bell, is passed through the speaking induction coil in order to convert the signals into an alternating current.

The receiving device may be a loud form of telephone receiver with a horn, or a vibrating relay tuned to the sending frequency, which brings a calling signal into operation.

An arrangement developed by the Western Electric Co. is as follows: The generator is of the vibrating-bar type, the natural frequency of which is 140 periods per second. The relay designed to receive the signals consists of a bar tuned to the same frequency, and actuated by the received currents, which pass through bobbins wound on pole pieces on each side of the reed. A light contact spring rests normally on the reed and makes contact with it. When the reed vibrates, the contact is broken intermittently and this can be made to release a relay connected in a local circuit.

The receiving apparatus must be so designed that it will not respond to the telegraph signals.

A relatively poor circuit, unsuited for working on the long-distance system, is usually obtained. This is due to several causes. A telegraph line wire may be iron and will, moreover, always be subject to a certain amount of disturbance. Generally the conductor will not be of a high-grade telephone type. If such a circuit is extended, complications arise, and transformers, involving further transmission loss, become necessary.

This system works most successfully on relatively short circuits which do not require to be extended. If, however, the device is installed on a high-grade copper conductor, the speaking range may be considerably increased.

Since Van Rysselberghe's system numerous inventors have exercised their ingenuity in producing the same result by different means. As well-known examples in this country may be cited the Phonopore circuit, patented by C. L. Langdon-Davies (Britsh patent No. 10,990 of 1884), and the Turchi-Bruné system (British patents Nos. 7,585 and 22,388 of 1903).

To give an idea of one of the many variations on the Van Rysselberghe method, Fig. 6 has been prepared. This shows an arrangement in which a bridging coil is placed in series with the receiver. When used in local circuits with a powerful transmitter it is capable of giving excellent results in circuits of suitable length.

This apparatus suppresses noise by sacrificing transmission efficiency in the receiving circuit, but if the receiver be made insensitive to the extent that it cuts down the volume of speech to the same degree as 20 miles of standard cable—which usually suffices to reduce load noise to tolerable limits—there is still a possibility of utilizing the arrangement on many circuits, seeing that the commercial limit of speech is not reached in a quiet room until a total of 46 miles of standard cable is in circuit. It is, of course, desirable to keep far within that limit, and the margin available often permits this to be done on local circuits which do not require to be extended, when used in conjunction with a powerful transmitter.

It should be noticed that "side tone" which painfully affects the ear when loud-speaking telephones are used in standard sets, is practically reduced to negligible proportions owing to the circuit arrangement in this and similar cases.

The Fulierphone occupies a prominent place in the literature of the subject.

Fig. 7 shows an arrangement used in

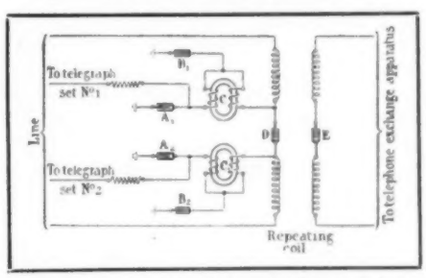


Fig. 7.—Two Duplex Circuits Formed from the Two Wires of a Double Wire Circuit.

England and elsewhere for utilizing the two wires of a double-wire circuit to form two duplex circuits. This arrangement is known as composited working. In this country (England) the arrangement is sometimes used to superpose telephone

call wires worked by telegraph, upon junction circuits worked on the common battery system (see Fig. 7), or, alternatively, one wire is used as a telegraph call wire, and the other for automatic signaling on the junction circuit.

In such a case each set of apparatus bridged on the telephone circuit involves a transmission loss, which is usually not less than one mile of standard cable, and may possibly exceed this figure. The loss is increased when similar circuits are extended to one another; it should, therefore, be ascertained, before doing this, whether the circuits have the necessary transmission margin.

It may be mentioned that simplexed and composited sets have been used in this country for many years. (A simplexed circuit is a telegraph circuit worked in parallel over the two wires of a telephone circuit.) As an example I find that as far back as 1908, 200 circuits on the simplexed system were in use in this country.

At the same time a large number of circuits were in use for local telephone circuit working on a method devised by W. J. Medlyn which has largely been used in

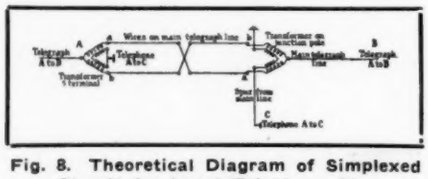


Fig. 8. Theoretical Diagram of Simplexed Circuit for Local Telephone Circuit Working.

this country for this purpose. The theoretical diagram is shown in Fig. 8 and the explanation is as follows:

If on a short section of a pole route carrying a long main-line telegraph circuit, we have also a local single-wire circuit which it is desired to convert to telephone working, such a circuit may be converted to double-wire working with little cost in the main-line section by utilizing in that length a long-distance telegraph circuit to form the second wire of the local pair.

The local single-wire circuit and the telegraph circuit are crossed at intervals to give immunity from inductive disturbance due to contiguous telegraph circuits, and transformers are connected as shown. The section between the transformers is the double-wire telephone circuit. Telegraph signals pass in parallel over the double-wire telephone circuit thus formed, entering and leaving the double-wire section at the center point of the transformers. By this method the continuity of the telegraph circuit is not interrupted.

The working of such a telephone loop is not disturbed by a superposed telegraph circuit if the *A* and *B* wires are of the same material and gauge. In the case shown, the telephone circuit after leaving the main line is run on a single wire which is connected to the transformers as shown. The possibility of using the single wire depends on local conditions.

The well-known equipotential method of superposing is of great importance and utility and of very wide application. Fig. 10 furnishes an example of the system. The earliest patent specification in this country covering this form of superposing is that of F. Jacob (British patent No. 231 of 1882).

The relative transmission efficiency of side and phantom circuits in aerial lines depends essentially on the arrangement of the wires on the poles. Every circuit has, of course, four electrical constants, namely, resistance, leakance, capacity, and inductance. Effective, uniformly distributed values at alternating-current voice frequencies are here assumed.

The relative transmission efficiency of both side and phantom circuits is inversely proportional to the real part β of the complex attenuation constant $\beta + ja$ and may be found from the following well-known formula:

$$\beta + ja = \sqrt{[(R + j\omega L)(G + j\omega C)]} \quad \ldots \quad (5)$$

where β = real part of attenuation constant,

a = wave-length constant,

R = effective resistance per unit length,

L = effective inductance per unit length,

G = effective leakance per unit length, and

C = effective capacity per unit length.

The transmission efficiency is also affected by the impedance of the circuit. In the case of an electrically long line the quantity Z_0 is usually known as the characteristic impedance; and

$$Z_0 = \sqrt{\left(\frac{R + j\omega L}{G + j\omega C}\right)} \quad \ldots \quad (6)$$

The minimum attenuation constant in unloaded circuits is theoretically attained when we have the relation

$$LG = CR \quad \ldots \quad (7)$$

In phantom circuits, where two wires are joined in parallel the resistance is generally half that of the side circuit, and the leakance double that of the side circuit. If, therefore, C is also doubled and L halved as compared with the side circuit, equation (7) is satisfied and we have the conditions for minimum attenuation for both side and phantom circuit.

Now R and G are generally fixed for any combination of side and phantom circuits, and have the relative values given. Whether the minimum attenuation constant is in question or not, we have equal transmission efficiency, if, when the side-circuit constants are C, G, L, R, the phantom-circuit constants are $2C$, $2G$, $\frac{1}{2}L$, $\frac{1}{2}R$, and this furnishes a criterion for the comparison of transmission efficiency. As a general rule the capacity and inductance have not the proportion shown.

As is well known, the circuit inductance and capacity vary according to a logarithmic function of the distance apart of the wires. The nearer together the wires of the side circuit are, and in the case of the phantom circuits the nearer together the side circuits—which constitute the limbs of the phantom circuit—the greater the capacity and the less the inductance, and vice versa.

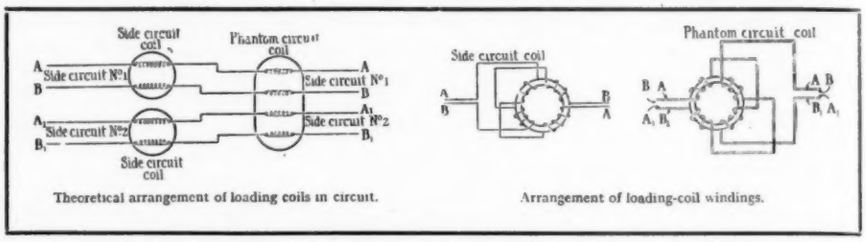

Side circuit coil
Phantom circuit coil
Side circuit No. 1
Side circuit No. 2
Theoretical arrangement of loading coils in circuit.
Arrangement of loading-coil windings.

Fig. 9. Arrangement of Coils in Loaded Side and Phantom Circuits.

As a general rule the transmission efficiency of a circuit is improved by separating the wires more widely, because the normal capacity of a circuit as compared with its inductance is in excess from the point of view of the capacity and inductance required to produce the minimum attenuation constant.

The separation of the wires tends to bring both the capacity and inductance nearer to the proportion that satisfies the minimum attenuation constant. There is, however, an accompanying disadvantage here, because unless a circuit is perfectly balanced the separation of the wires increases inductive disturbance from sources of disturbance outside the superposed four-wire system.

The relative transmission efficiency of two common arrangements will now be examined. If the four conductors of a phantom-circuit combination are arranged on the pole-arms so as to form a square as seen end-on, two wires being arranged

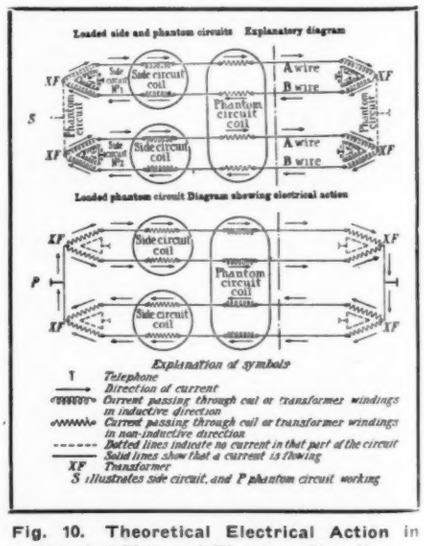

Loaded side and phantom circuits Explanatory diagram
Side circuit coil
Phantom circuit coil
A wire
B wire
Loaded phantom circuit Diagram showing electrical action
Explanation of symbols
Telephone
Direction of current
Current passing through coil or transformer windings in inductive direction
Current passing through coil or transformer windings in non-inductive direction
Dotted lines indicate no current in that part of the circuit
Solid lines show that a current is flowing
XF Transformer
S illustrates side circuit, and P phantom circuit working

Fig. 10. Theoretical Electrical Action in Loaded Side and Phantom Circuits.

on one arm and the other two immediately below on another arm, the side circuits being the diagonal of the square, it can be shown theoretically that the relative values of capacity and inductance of side and phantom circuits are such that the capacity of the phantom circuit is greater than twice the capacity of the side circuit, and that the inductance of the phantom circuit is somewhat less than half that of the side circuit.

It follows that the transmission efficiency of the phantom circuit is a little less than that of the side circuit.

The arrangement described is that which has hitherto been adopted in this country, the anti-inductive arrangement consisting in transposing the position of each wire on the pole arms so that a complete revolution takes place between every four poles.

An alternative anti-inductive method to that described, still retaining the square formation on the four pole arms, is to run the wires straight for a given length—say half a mile—and then cross them at regular and equal intervals of half a mile.

The transmission efficiency of the two anti-inductive methods described, both being in square formation, is nearly equal. Experiments in this country showed a difference of 2 per cent in the attenuation constant, being less to that extent in the case of the wires run straight.

The two side circuits being formed of adjacent wires from left to right in each case and supposed to be crossed at equal intervals, it can be shown that the inductance L of the phantom circuit is greater than one-half that of the side circuit, and that the capacity C of the phantom circuit is less than twice the capacity of the side circuit. As a consequence the phantom circuit has a lower attenuation than that of the side circuit, and this is verified in practice.

TABLE 1.

Capacity formulae for aerial lines from "Telephonic Transmission of Superimposed Circuits," by Kazukiyo Ogawa, Researches of the Electrotechnical Laboratory, Department of Communications, Tokyo, Japan, July, 1919.

Wires arranged in square formation.

Side circuit—

$$C = \frac{1}{4 \log (d/r)}$$

Phantom circuit—

$$C = \frac{1}{2 \log (d/2r)}$$

Inductance formulæ—

$$C = 4 \log (d/r) + \mu$$

$$L = 2 \log (d/2r) + \mu/2$$

r is the radius of a conductor, d is the distance between the wires of the side circuit, and μ is the permeability of the conductor, assumed to be constant.

Wires in a straight line on the same arm at equal distances, the wires composing the side circuit in each case being crossed with each other at regular intervals.

Side circuit—

$$C = \frac{1}{4 \log (d/r)}$$

Phantom circuit—

$$C = \frac{\log (\sqrt{3}d/2r)}{2 \log (d/r) \log (3d/r)}$$

Inductance formulæ—

$$L = 4 \log (d/r) + \mu$$

$$L = 2 \log (3.46d/r) + \mu/2$$

The first patent for air space type of cable with multiple twin circuits was that of Dieselhorst and A. W. Martin (British patent, 12,526 of 1903).

In these cables the relative transmission efficiency of side circuits and phantom circuits, respectively, follows the general rule, and depends on the relative values of their inductance and capacity.

Owing, however, to the fact that the wires making up the side and phantom circuits in cables are closely packed together, the capacity is relatively much larger, and the inductance much smaller than in the case of aerial wires, for the reason already given, and consequently the transmission efficiency of such unloaded circuits is much less than those of the same conductor weight in aerial lines [see Formula (5)]. As a rule the capacity of telephone circuits in cables containing a large number of wires is predicted from experiment, since it is largely affected by a factor depending on the form and dimensions of the cable.

Telephone air-space paper cables for phantom working are usually made up on the "multiple twin" formation—i. e., two telephone pairs are twisted together to form a phantom pair—and the relative capacity of side and phantom circuits may vary largely. The lay of the conductors is varied in the usual way. Experiment on recent cables shows, however, that the capacity of a phantom circuit has usually a mean value approximately 50 per cent in excess of that of the side circuit.

The natural inductance in telephone cables containing small-gauge conductors is so small as to be nearly negligible and will be left out of consideration. Artificial inductance is, of course, generally added to underground circuits which form part of the trunk or long distance system, and the problems of circuit balance presented by these loaded circuits will be dealt with further on.

On account of the relatively small capacity of the phantom circuit in such cables as compared with the capacity of the side circuits, the phantom circuit is of a higher transmission efficiency than the side circuit, so that by superposing we actually obtain an additional circuit which is more efficient than the circuit on which it is superposed.

It should be noted that it is possible to carry the principle of phantoming further, and to obtain a second phantom metallic circuit by combining two four-wire cores and twisting them together in the same way as the two side circuits are twisted in order to form an ordinary phantom circuit.

Eight wires would evidently be necessary for such a circuit, and the principle may theoretically be continued, using 16 wires, 32 wires, etc., for successive phantom circuits until the number of combinations is exhausted. In practice, however, phantom circuits are limited to four-wire combinations at present.

It is possible under favorable circuit conditions to combine the loaded phantom circuit, as shown in Fig. 10, with the composited arrangement shown in Fig. 7. For this purpose the telegraph sets arranged as in Fig. 7 may be added to the ends of the two side circuits in Fig. 10.

In order to secure a balanced arrangement it would be necessary for all the telegraph sets to have the same impedance at the same end of the line. Such a circuit would be subject to the limitations pointed out in connection with the phantom circuit and the composited circuits. It is believed that an equivalent arrangement is worked in America, but it has not been used in Europe to the author's knowledge.

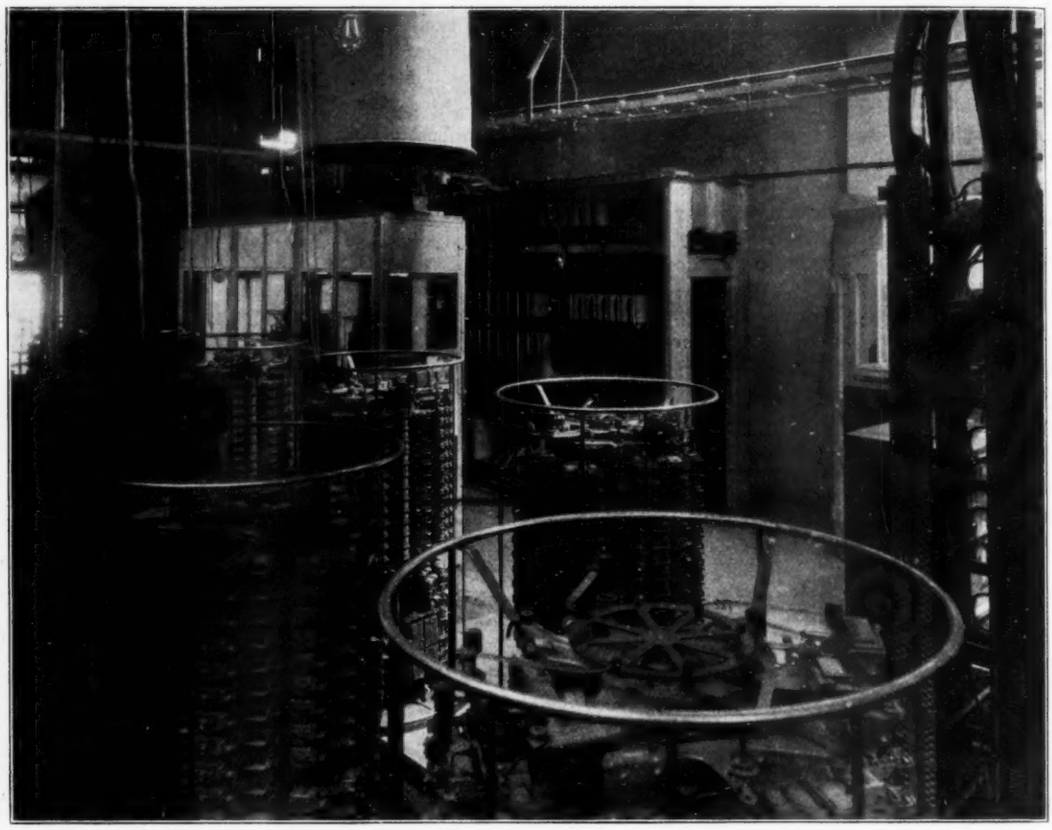
Transformer apparatus in phantom circuits absorbs a certain amount of energy and the effect on telephonic transmission requires consideration. Moreover, the usual signaling frequency is about 1,000 periods per minute, or approximately 17 per second, whereas the mean frequency of speech is taken at 800 periods per second.

The design of a transformer of small dimensions to meet both these requirements is difficult, and for that reason there is an advantage in utilizing a frequency within the range of frequencies for which the transformer has been designed. A transformer designed and sold by the Western Electric Co. and known as "type 4006A" is, however, available for this purpose. At a frequency of 133 periods per second, it is found to be very efficient for signaling, and it is specially efficient at telephonic voice frequencies.

The Post Office specification which requires an output of 80 per cent of the input energy at a frequency f such that $2\pi f = 5{,}000$, and of 55 per cent at a frequency f such that $2\pi f = 100$, is met by this apparatus; it also fulfills the stringent condition imposed for differential action when currents are sent through the windings in opposite directions.

The transmission loss (core loss) observed in comparative speech tests does not exceed the loss which takes place when speaking through one mile of the standard cable.

It may be mentioned that the method of winding to secure the differential action is one devised by the Post Office. Other manufacturers also make efficient transformers. *(To be concluded.)*



The Richmond Home Telephone Company began the use of Strowger Automatic equipment in 1907. All of the original installation is still in service, and, with the several additions made at various later dates, is rendering a grade of service that is completely satisfactory.

Strowger Equipment is Always Modern

The switchroom illustrated on the opposite page is that of one of the several automatic offices operated by the Richmond Home Telephone Company at Richmond, Indiana, where old and new Strowger Automatic switches are operating together in complete unity, giving modern dependable service at a profit.

Many cases such as this are on record where equipment already in service fifteen or more years is linked with additions of the latest type and the whole operated for many years almost as satisfactorily and economically as installations that are entirely new.

Telephone operating men who are contemplating replacing their central office equipment are invited to investigate this and the many other attractive features of the Strowger Automatic system.

Automatic Electric Company

FACTORY AND GENERAL OFFICES: CHICAGO, ILLINOIS

BRANCH OFFICES IN ALL PRINCIPAL CITIES

ASSOCIATED COMPANIES

INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York

International Automatic Telephone Company, Ltd. London.

Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston Paris.

Automatic Telephone Mfg. Co., Ltd., Liverpool.

Automatic Telephones, Australasia, Ltd., Sydney

Toll Service and Ticket Detail

Accurate and Complete Recording Has a Prominent Part in Good Toll Service—Saves Operator Time, Circuit Time, Annoyance to Patron and Real Money for the Company—Paper Read at Syracuse Meeting of Up-State Association

By R. C. Speier

Manager, Operators' Training Department, Rochester Telephone Corp., Rochester, N. Y.

In order that a call may have a good start, it is essential that recording operators realize the responsibility which rests upon their entering the necessary details on the ticket. The service that the subscriber will receive depends, to a great extent, upon the manner in which the call is accepted. If courtesy, intelligence and interest are displayed by the recorder when she accepts the call, it will be started right—and a good beginning generally assures a good ending.

It is very necessary and important that operators be accurate in recording the details of calls in order that complaints may be avoided and circuit time saved.

Consider the result of the inaccurate recording of a toll call.

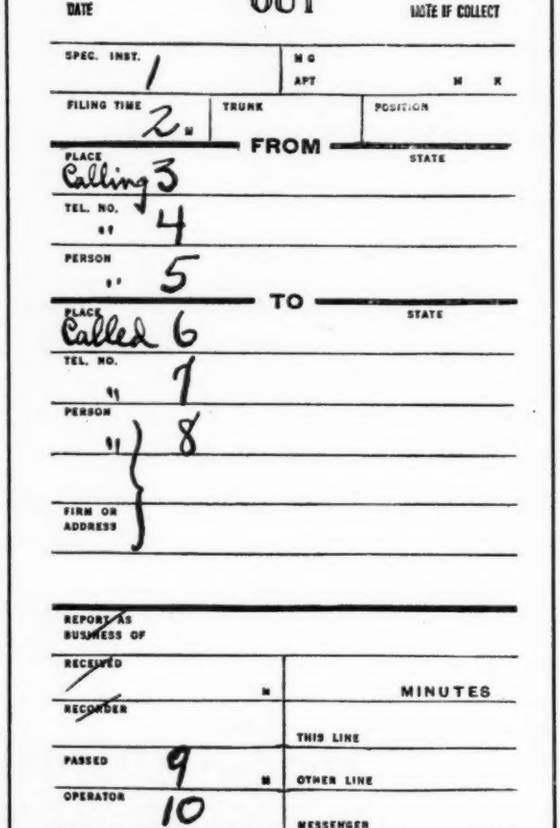
If special instructions are given to a recorder and she fails to make a notation of them, the operator who works on that ticket may give out information which the calling subscriber expressly desired to withhold, thereby causing a complaint. The omission of special instructions may also result in the operator not being able to complete a call which she, in all probability, could have completed had the special instructions been recorded on the ticket.

Accuracy of filing time is very important. If an incorrect filing time is recorded, a call which should be given precedence may be delayed, and a subscriber may in that way be deprived of the use of a circuit which is justly his.

An incorrect calling number holds up the ticket and delays reports, thereby causing complaints and dissatisfaction. These wrong numbers are particularly due to the recording of the wrong exchange and the omission of the letter on a party line.

The obtaining of the calling party's name is necessary because it is a means of identifying the call at the calling station. Very often it is the means of saving circuit time or preventing the calling party canceling a call because the person who placed it cannot be located.

In regard to the recording of the correct code for the called place, it is necessary that great care be used. If there is no code for the place called, the entire name should be written; also care should be taken to ascertain the state and, if necessary, the county of the called place—if there is another city or town in another state or county of the same name as that of the city or town given. This thereby prevents a call being completed to the wrong destination, to the annoyance of the subscriber and the expense of the company. Mistakes of reaching the wrong destination are often caused by illegible letters in codes, particularly *A* being taken for *O* and *M* for *W*.



Filling In the Ticket Accurately and With All Obtainable Information Makes for Good Service.

The called number, if given, should be carefully recorded. Subscribers should be encouraged to call by number because it saves the time that otherwise would be used in referring to the directory, and in larger offices this relieves the directory position of traffic.

The called party's name, initials and the firm name, if given, should be carefully checked, to avoid difficulty which may arise at the distant point from an incorrect but a similar name.

When routing directions are placed on a ticket, it is of the utmost importance that the code be written very carefully to avoid the wrong routing of the call, thereby causing delay and incorrect use of toll circuits.

The passed time should be noted as soon as the call is passed. Occasionally it is observed that the starting time is earlier than the passed time. Sometimes subscribers, who have been given their tickets to check, have noticed this condition and later have not hesitated to mention the fact when complaining of excess overtime, etc.

Recorders and line operators should be advised of the necessity of placing their operating numbers in the correct spaces and to cross their numbers off when they complete, as far as they are able, the work on a call. The operator's number on a ticket is the only means of identifying the operator who did the work on the call. Operators are occasionally blamed for poor service for which they are not responsible, because they fail to cross off their numbers.

In making entries on the back of the ticket it is very important for the proper completion of the call to have all codes and reports properly made and correctly timed and to be entered in the order in which they occur. Reports which cannot be exactly expressed by code should be written on the back of the ticket in full.

In conclusion, the ticket is an order for service. It is just as necessary for us to get the correct details of the call and note them intelligently and correctly as we would expect our order would be taken and noted, were we ordering a bill of goods from a merchant. We would expect that the order clerk would need to know the size, length, color and quality of the article desired and, once having

accepted our order, to fill it without further question.

Our patrons expect as much from us as they do from their merchants. They do not object to giving the order for service, but they certainly do object to recalls to verify details which should have been properly recorded at the time the call was accepted.

Therefore, complaints and circuit time can be saved and revenue increased by accurate recording of the details of a call and noting of the reports given in the proper order.

Interstate Utilities Co. to Spend $100,000 in Inland Empire.

Improvements in the telephone system of the Interstate Utilities Co. of $100,000, including substantial improvements in the lines of communication in a score of Inland Empire towns, were announced recently by John F. Davies, vice-president and general manager.

The company operates the telephone system of the panhandle of Idaho, and also exchanges in eastern Washington and western Montana. The executive offices of the company are in Spokane.

The budget of improvements of the telephone plant for 1923 includes marked improvements in the telephone system at Libby and Troy, Mont; Bonners Ferry, Sandpoint, Spirit Lake, Priest River, Rathdrum, Plummer, St. Maries, Kellogg, Wallace and Mullan, Idaho, and at Newport, Ione and Tekoa, Wash. The most important feature of the work is the proposed construction of a $35,000 central office building at Coeur d'Alene, including switching equipment of the latest type and design.

The plans also provide for an enlarged switchboard for the telephone exchange at Libby, Mont. At Troy, Mont., considerable outside construction will be required immediately to meet the requirements of lumbering operations.

A new toll line will be constructed along the recently completed portion of the North and South highway between Sandpoint and Bonners Ferry at a cost of $15,000. This will give three long distance circuits between Sandpoint and Bonners Ferry instead of one.

Metallic circuits will also be constructed during this year from Sandpoint to the Clarks Fork exchange, and between Sandpoint and Rathdrum to serve Athol, Granite, Cocolalla and other small towns. A new toll line will be constructed early in the spring between Tekoa and Plummer to give Tekoa direct connection with the Interstate Utilities system.

Subscribers of the Interstate Utilities Co. at Burke, in the Coeur d'Alene mining district, are served out of the central office of the telephone company at Wallace and the subscribers at Wardner are served out of the office at Kellogg. The budget for 1923 calls for the expenditure of $7,000 in cable construction to improve this service. An expenditure of $5,000 in additional outside facilities for St. Maries and the surrounding territory also is provided.

A new switchboard will be placed in the exchange at Newport.

Important Questions Up for Discussion at Oregon Convention.

At the annual meeting of the Oregon Local Telephone Association, which was scheduled for Friday and Saturday of this week in Portland, the principal questions on the program for discussion were:

Right of way upon state highways—which, the association states, seems to have been practically nullified by the present highway commission;

A proposed change in the utility law whereby the quality of service rendered shall be a factor in rate fixing, rather than valuation alone.

The matter of electrical interference by induction from power lines, and the rights of interested parties therein.

So that as many as possible might be present when these matters were considered, the association arranged to have them brought up on Saturday.

The Index for Volume 83 of TELEPHONY.

The index for volume 83 of "Telephony," which was completed with the issue of December 30, is now ready for distribution among those who keep complete files.

In this index are listed all the important articles which have appeared between July 1 and December 30. It will be supplied free of charge to those making application.

Many Things Gained by Attending South Dakota Meeting.

Arrangements have been practically completed for the annual convention of the South Dakota Telephone Association, to be held in Huron on January 17, 18 and 19, at the Marvin-Hughitt Hotel.

Some new and practical ideas on topics of current importance will be presented by men experienced in telephone work, as well as by representatives of the state railroad commission and the tax commission.

The special feature of the convention will be the plant school, in which the matter of inductive interference will be thoroughly discussed, together with other matters pertinent to successfully maintaining and operating telephone plants. Regarding this, President J. A. Steninger, of the association, reminds the members that the matter of inductive interference will come to them all sooner or later, as the development of high power transmission lines in South Dakota is yet in its infancy.

Convention rates have been secured from the Marvin-Hughitt and the Royal hotels. Reservations should be made early, as the committee in charge of the convention program are looking for an attendance larger than ever before.

The association wants all of its members to be present and invites non-members to come along, too, and learn for themselves the benefits to be derived from the association's activities.

Hoover Seeks Radio Control to End Nightly Bedlam.

Control must be established over the bedlam filling the air from 21,000 radio transmitting stations, Secretary Hoover told the House merchant marine committee January 2 at hearings on the Kellogg-White federal radio control bill. Representatives of amateurs and various others interested in wireless communication also were heard by the committee.

The bill provides that the Commerce Department shall have supervision over all radio communication, assigning wave lengths, approving apparatus, licensing operators and otherwise supervising wireless communication to bring order out of the present chaos of jazz bands, sermons, crop reports, sporting services, concerts and what not running simultaneously on the same wave lengths.

Vigorous protest was entered by the war and navy departments against a provision of the bill which stipulates that whenever government apparatus is used for other than government business it shall come under supervision of the Commerce Department.

The navy operators, it was said, would have to obtain license from the Commerce Department if the section was retained. Secretary Hoover told the committee he would confer with Secretary Denby in an effort to reach an accord on that feature, but he insisted that the navy should not be permitted unlimited privileges to the discomfiture of other users of wireless.

Cumberland Bell to Spend Two Million in Tennessee.

The building program for the extension and betterment of service by the Cumberland Telephone & Telegraph Co., which contemplates the expenditure of $2,000,000 for 1923 in Tennessee under the terms of an order issued by the Tennessee Railroad and Public Utilities Commission.

It will mean the building of conduits and additional office equipment in the central and branch exchanges in Nashville to the amount of $300,000, and expenditures in Memphis of $535,000, and expenditure of $285,000 in Chattanooga and $65,000 for Knoxville, while the proposed work on small exchanges in the state during the year will take up $175,000 of the amount. The company also estimates that $500,000 will be required in placing 22,000 new substations.

Sundry Snapshots Along the Trail

Observations and Comments, Pertinent and Otherwise, On the Sunshine and Shadows of Telephone Work

By Well Clay

Greeting.

In ancient times, as run the rhymes,
When snow was on the ground,
They gathered all in the banquet hall
From many miles around.

In the firelight all eyes shone bright
As they quaffed the home-made ale,
Or joined their host on massive roast
And told a merry tale.

Each honored guest must stand the test
And join in song or story,
At the host's request they did their best
And flunked, or garnered glory.

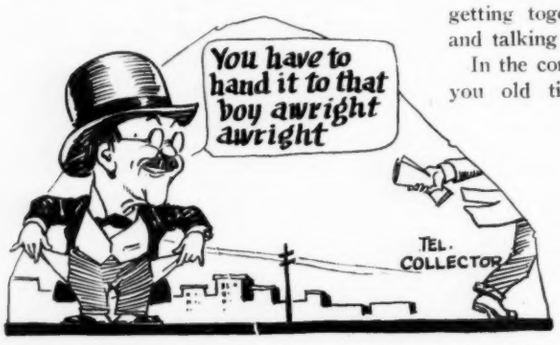
Let's summon all with a friendly call
To gather this new year,
In memory's hall and let each recall
Some thoughts of old time cheer.

'Twould be our request, as an honored guest,
That you should take the chair,
And call each name to start the game
To banish all dull care.

Each cheerful face is in its place
Our hearts are all aglow,
We'll dig up things from memory's springs
Which happened long ago.

We extend the call to one and all
To join in this bright new year,
And we can truly say, this winter day,
Remembering you has brought cheer.

That was about the only way to get the news of the day and opinions of the people in the olden times when newspapers, telephones and radio were undreamed of mediums of spreading information. So they had all the people gather in the big banquet hall and there assimilate news, booze and indigestion simultaneously. In other words, it was an old-time convention.



You Get the Other Fellow's Idea of How to Make Collections and Leave the Patron Smiling Though Broke.

Many telephone associations hold their conventions in the winter time from now on. While the complexion of conventions has changed considerably by reason of activities of a certain person entirely outside telephone circles, yet they have changed for the better and have lost nothing of their most profitable features. The renewal of friendships already made and the forming of new ones, coupled with the mass of valuable information acquired, have ever been and always will be the real sought-after features of conventions in any line of endeavor.

You go to conventions primarily with these things in your mind: You have a pleasant anticipation of greeting old friends and, perhaps, of meeting people of whom you have heard but never met, and then you propose to slide down the hall and look over the exhibits to see what is new. After that you listen to speeches and, perhaps, you make the best one.

You get a new angle of observation on many of the questions which perplex you in every-day practice. You get the other fellow's idea of how best to make collections and still leave the patron smiling, though broke.

You find out what the other fellow has done about meeting the transportation problem of his repair and building crews. You learn about what can be done about your poles along the public highway where new road projects are forward. You get a chance to look over new wrinkles in the matter of station protection from lightning and commercial currents and, perhaps, can listen to a paper on just why and how some protectors protect and where others fall down. You get to know a lot about every-day problems just from getting together in the lobby or hallway and talking shop with the rest of the boys.

In the conventions now about to be held, you old timers will have to accelerate your step if you are to keep up with the procession, for you will find much talk in the air pertaining to this new-fangled stuff called radio.

Glib young sprouts will swamp you with discourses on various kinds of hook-ups, girds, couplers, variometers, detectors, amplifiers and a host of other new things; you will have to get a few old cronies back in some baggage room if you wish to discourse on the old-time questions of grounded lines, full metallic, dry batteries, ground rods, battery savers and such long-forgotten questions which occupied the time of old-time conventions.

One of the things which never does go out of date, or fail of interest, however, is the question of service. Service is the last thing to be allowed to go into the background. Whether it is service to the patron, service of an arrester, pole line, dry battery, automobile, adding machine or telephone association, it matters not. Service is the final arbiter of the fate of all.

So They Had All the People Gather in the Big Banquet Hall and Assimilate News, Booze and Indigestion.

When the old-fashioned cut nail met up with the wire nail, its use ceased almost over night because the wire nail gave better service, cost less to make and did not require an expert carpenter to drive it without splitting the board nine times out of ten. On the other hand, the meek and lowly carpet tack which was just as old as the wrought nail is still occupying the center of the stage at all house-cleaning affairs, because it gave and is still giving adequate service, and there seems no necessity to improve on it in its present form.

The pin and the pants button are both samples of what they were for generations back; yet how few of us would think of going to a convention lacking some of these most useful adjuncts to modern civilization.

While we must and do progress, we cannot go beyond perfection, even if we can approach it, which is hard. The great object of telephone conventions is to serve you, and you should add your little mite of information, gained by your experiences in your home-town, to the general mass.

The reason for this is that without all the component parts nothing attains 100 per cent. You are one of the parts which help to make up the whole, and if you or your store of hard-gleaned knowledge, are missing from the make-up of the gathering, just so much will the whole lack of attaining that muchly-desired 100 per cent.

You are, in a way, part of the gas which

helps to make the machine go. I do not mean this in a joking way which would be supposed to reflect on your oratorical powers but as a means of illustration. If you are not to be considered in the gaslight column, you can play the part of some of the rest of the things so necessary to make up a perfect functioning machine.

You need not be afraid you will be considered a back number because 9/10ths of the others in attendance will be on a par with you in scope of experiences. The radio bugs are not so deep as they might like to have you think they are.

They are only on a line with what you liked to have other people think you were when you first began to install telephones, while the amazed and interested family stood around to watch you. How you tried to carry it all off as old stuff when, as a matter of fact, you knew but little more than the ones who thought you must be an electrical wizard to be able to connect up batteries and start the thing to working so they could talk. You remember that, don't you?

These conventions are held for you and not primarily so some manufacturer can make a few sales. If you don't attend them, you are missing out on some of the best experiences of a telephone career.

APHORISM: Few fish jump into the boat.

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Settlement Gives Bell Temporary Increase in Tennessee.

Settlement of the Cumberland Telephone & Telegraph Co. rate case, which has been before the Tennessee Railroad & Public Utilities Commission for more than a year, was reached on December 28—the company being granted a small increase in rates, affecting 47 Tennessee cities.

The order is effective for the period between January 1 and date of final determination, final hearing being set for March 5. It was made following argument of counsel for protestants opposing the proposed schedule or any schedule of higher rates.

The increase is approximately one-fifth of the amount asked for in the original application, and is an advance of 5.7 per cent over the old rates.

The order granting the increase was made temporary, pending the supplying of information from time to time by the company to the commission, upon which a rate base and permanent exchange rates may be fixed in the state.

Settlement of the case was reached after company officials had filed a compromise schedule of rates and had agreed to expend $2,000,000 during 1923 in improving the service and meeting the demands of its subscribers. The commission members, Chairman Julian Campbell, H. H. Hannah and W. H. Beasley, were unanimous in deciding the case.

The increase will affect patrons in the four larger cities of Tennessee to a greater extent than the smaller ones. An additional charge of 50 cents for business telephones and 25 cents for residence telephones will be made against subscribers in Nashville, Chattanooga, Memphis and Knoxville. In the smaller cities the rate increase will be in proportion to the number of telephones in use and the length and number of lines in operation.

Under terms of the compromise, the company agreed to refund to the commission, all costs that the commission has incurred in connection with the case; to withdraw all litigation against the commission; to pay expenses of the "steering committee" of protestants and to cut down by the end of 1923, unfilled applications for telephone service not less than 75 per cent.

The settlement of the case was first suggested by F. H. Reid, vice-president of the company, who spent several days in Nashville consulting expert engineers of the commission.

It was shown by figures set out in the amended application that the Cumberland Bell will receive a total increase in revenue of about $383,000 a year in place of $975,000 as originally asked for. The company, under terms of the order, is required to file with the commission monthly reports — beginning February 1 — showing definitely and fully how it is complying with the order with respect to the extensions and amount of revenue which is taken in.

This is the first substantial relief the company has received in 10 years, with the exception of a temporary increase granted during the war, which was subsequently revoked. The rates in effect up to January 1 were the same as the rates in 1921.

Immediately after the ruling, Chairman J. D. G. Morton of the "steering" committee—representing telephone subscribers throughout the state—announced that the committee was prepared to resist the increase and would fight to the end. A similar statement was made by Walter Armstrong, city attorney of Memphis.

Approves Merger of Illinois Bell and Kinloch Companies.

The merger of the Kinloch Telephone Co. of St. Clair County and the Illinois Bell Telephone Co. was given the approval of the Illinois Commerce Commission on January 5.

The order was issued with the provision that there shall be no increase in rates for at least a year.

Frank L. Smith, chairman of the commission, issued a statement relative to the order. Chairman Smith said the consolidation was authorized to get for the people of the district the benefits of a unified service.

"Experience has proved that duplication of utility service is inefficient, annoying, wasteful and the quality and quantity of service considered, much more expensive than a single service," said Mr. Smith. "Therefore, the commission believed that it would be to the best advantage of all concerned to permit the consolidation and that under the consolidation the communities served will, in the end, be given a much better service than they could ever hope to get with a duplicated service."

California Company Authorized to Issue $200,000 Stock.

The Associated Telephone Co., of Long Beach, was authorized by the California Railroad Commission on December 28 to sell $200,000 par value of its common capital stock for the purpose of financing the cost of extensions, additions and betterments to its properties. According to the order, 100 shares may be sold at $90 a share to fill the oversubscription of a previous stock issue. The remaining 1,900 shares are to be sold at not less than $100 a share with a selling cost not to exceed 5 per cent.

California Company to Issue Bonds to Reimburse Treasury.

The Santa Barbara Telephone Co., of Santa Barbara, has been authorized by the California Railroad Commission to sell $60,000 of its first mortgage, 5 per cent, 30-year, sinking fund, gold bonds. The order was issued January 4.

The bonds are to be sold for cash at not less than 87½ per cent of their face value and accrued interest, and the proceeds are to be used to reimburse the treasury for earnings used for capital purposes.

Indiana Investigation Takes Up Financing and Operating.

Evidence intended to show that the American Telephone & Telegraph Co. provides necessary financial backing for

the Indiana Bell Telephone Co. was introduced by the company at the hearing on affairs of the Indiana Bell before the Indiana Public Service Commission Saturday, January 6.

After a short session, devoted exclusively to the testimony of Fred C. Dickson, vice-president of the Union Trust Co., the hearing was adjourned until this week.

W. H. Thompson, attorney for the telephone company, presented the financial situation of the company to Mr. Dickson before beginning examination. Mr. Thompson said the Indiana Bell has capital of $15,000,000, a funded debt of $11,000,000 and a short term note debt of $4,000,000. Practically all of the debt is due the A. T. & T. Co., he said.

"Under those circumstances," Mr. Thompson asked the witness, "would it be possible for the Indiana Bell to float its securities without the aid of the American Telephone & Telegraph Co.?"

"Not very easily," Mr. Dickson replied.

Mr. Thompson then reviewed further financial relations of the two companies, including an $11,000,000 loan to the Indiana Bell by the A. T. & T. at 7 per cent on notes. He then asked the witness if, assuming such a sum could be borrowed in Indiana, it could have been borrowed on more favorable terms by the Indiana Bell.

"It could not have been borrowed as cheaply on those terms," said Mr. Dickson.

Mr. Dickson submitted other testimony in regard to financial matters at the request of attorneys for the commission.

Provisions made by the Indiana Bell Telephone Co. to care for its employes through pensions and workingmen's benefit plans were brought out at one of the hearings last week, through the testimony of Thomas R. Keyes, general auditor of the Indiana Bell Telephone Co. Mr. Keyes was a witness for the company and the bulk of his testimony concerned the assistance given to the Indiana Bell by the American Telephone & Telegraph Co. in auditing and finance.

"The service received from the American Telephone & Telegraph Co. with regard to plans for the benefit of employes is of great value to the Indiana Bell Telephone Co.," Mr. Keyes said. "The plans in many respects give the employes better return than the provisions of the compensation act."

Mr. Thompson asked him to give a specific example.

"We recently had an accidental death in Indiana when the beneficiary would have received $3,960 under the act, but actually received $720 more," Mr. Keyes replied.

Mr. Keyes declared that under the plan adopted by the Bell any employe of the company could go to some other part of the United States and work for the American Telephone & Telegraph Co. without losing credit for continuous service. He said that the pensions received by employes were based upon 1 per cent of the average salary for ten years, multiplied by the number of years of service.

"Of course, all these payments you speak of revert back to the fact that the subscribers pay for it. There is no other source of funds. Is that so?" asked Commissioner John W. McCardle.

Mr. Keyes replied that the subscribers paid for the workingmen's benefit plans.

"State to the commission whether such plans do not make for great contentment among the employes and improve the service of the company," said Mr. Thompson.

"In my opinion they are of very great value to the company and to the employes," Mr. Keyes answered.

He declared that the employes' benefit fund was provided for in the contract between the American Telephone & Telegraph Co. and the Indiana Bell Telephone Co., which requires the Indiana company to pay 4½ per cent of its gross revenue to the parent company in return for service and materials. He added that the plan would not be possible except for the guarantee of financial aid made by the parent company.

Since April 1, 1920, the Indiana Bell Telephone Co. has paid out a little more than $6,000 in pensions to employes, Mr. Keyes said. Since the adoption of the compensation plan by the company early in 1920, approximately $29,000 has been paid out for accident benefits, and approximately $18,000 for expenses resulting from accidents, Mr. Keyes declared.

"The American Telephone & Telegraph Co. stands back of us when it becomes prohibitive to maintain the pensions. That is where I consider the service comes in," Mr. Keyes said.

"If you save money by not contracting commercial insurance, the benefit eventually accrues to the American company, doesn't it?" asked Frank B. Farris, attorney for the commission, in cross-examination.

Mr. Keyes replied that the arrangement was good business, since it protected the Indiana Bell Telephone Co. He was asked to point out what other services the American Telephone & Telegraph Co. provided the auditing department of the Indiana Bell Telephone Co.

The services, he said, were practically continuous, and involved taxation, stock returns and a number of other things. Within the last two years the parent company had rendered valuable service by developing a new system of accounting and a system of checking and filing. The accounting system, he said, resulted in an annual saving of $12,135.

Further testimony concerning the relative economy and efficiency of improved types of telephone switchboards was given during the week to the commission. A. J. Allen, of New York, traffic engineer of the American Telephone & Telegraph Co., appeared Wednesday as a witness for the Indiana Bell Telephone Co.

Munson D. Atwater, of Bloomington, Ind., previously had testified before the commission that the Indiana Bell Telephone Co. could improve its service and save money by the use of the La Crosse type of switchboard. Mr. Atwater was a witness for the commission. Tuesday, Byron S. Bailey, of New York, witness for the telephone company, submitted a report to the commission in which he showed that the annual costs of the Bell company would be increased by the use of the La Crosse board, and that the service provided by it was no more efficient.

Practically the whole of Mr. Allen's testimony Wednesday was virtually a substantiation of the report made by Mr. Bailey.

He testified that the calling rate at La Crosse had not been increased by the use of the new board, but that what had been cited by Mr. Atwater as an increase of from 10,000 to 15,000 calls a month was actually the result of an automatic method of counting in use at La Crosse. Surveys at La Crosse, he said, showed that the rate had remained practically the same since the installation of the new board.

He declared that with the La Crosse board one operator working under ideal conditions could complete 2,300 calls a day, while with boards used by the Indiana Bell Telephone Co. at Muncie and at Indianapolis the same operator could complete 1,600 calls a day.

"Would you be justified in letting off one-third of your operators after the installation of a La Crosse board?" asked Frank B. Farris, attorney for the commission, during the cross-examination of Mr. Allen.

"That assumption is practically right," Mr. Allen replied.

They Like "Telephony."

From letters recently received by TELEPHONY we quote the following expressions:

"It is next to impossible to be a good telephone manager without TELEPHONY, and sometimes we could use more than one issue."—C. L. Patee, District Manager, Union Telephone Co., Owosso, Mich.

"TELEPHONY is a good paper for anyone in the telephone business. I have read it for almost 20 years. It is as good for Bell telephone employes as for Independents. Find enclosed my check for renewal for another year."—Chas. C. Black, Area Manager, Northwestern Bell Telephone Co., Stuart, Iowa.

Mr. Allen testified that he had made traffic surveys of telephone companies in many cities and that in places where both automatic and manual switchboards were used, the telephone users showed preference for the automatic.

He declared that the calling rate a line in Indianapolis was 7.2 calls a day, and that if the rate should increase, any advantage in the decrease of operators under the La Crosse system would be offset in Indianapolis.

Michigan Commission Gives Approval to Dowagiac Merger.

The Michigan Public Utilities Commission has given its approval to the merger of the Bell and the Home Telephone Co. exchanges at Dowagiac, Mich., and throughout Cass County—the new company to be known as the Dowagiac Telephone Co. The order was entered December 27.

It is planned to establish the same rural rates as are now charged by the Michigan State Telephone Co. in the territory which will be served by the new company.

New Switching Rates and Minimum Circuit Charge Allowed.

An order issued December 29 by the Minnesota Railroad & Warehouse Commission gave the Blue Earth Valley Telephone Co., of Blue Earth, permission to place in effect on January 1 a rural switching charge of 40 cents per month per station, subject to a discount of five cents if paid on or before the 15th of the month in which the service is rendered. A minimum charge of $2.00 per circuit was also authorized.

The company had requested authority to establish a minimum charge of $2.80 per circuit, but the commission decreased this to the basis of five parties per circuit.

The Blue Earth Valley company operates local exchanges at Blue Earth, Wells, Winnebago, Elmore, Guckeen and Huntley. From these exchanges it serves approximately 1,838 local and rural owned stations and from the first four exchanges it serves 1,199 rural switching stations.

Eight Companies Authorized to Continue Higher Rates.

Orders were entered by the Missouri Public Service Commission on December 18 permitting six exchanges to continue operations under increased rate schedules previously granted. Two similar orders were entered on the 19th.

The companies affected by the orders of December 18 are: Frankford Telephone Exchange for service in Frankford; Kansas City Telephone Co., for service in Independence and the Fairmount exchange area; Kinloch Telephone System, for service in St. Louis and vicinity; Mutual Telephone Co., for its exchange at Greenfield; and Sedalia Home Telephone Co., for service in Sedalia.

On December 19 the Linneus Rural Telephone Co. was authorized to continue its increased rates at Linneus, and the Thayer & Alton Telephone Co. to continue the rates at Thayer.

Monroe (Neb.) Company to Continue Present Rates Indefinitely.

Permission has been granted by the Nebraska State Railway Commission to the Monroe Independent Telephone Co. to continue indefinitely charging the present schedule of rates.

The company was given first relief in August of 1921, in the form of temporary rates, and it was figured these would increase revenues $7,000. Because of local conditions, that portion of the increase made contingent on the making of certain improvements was not put into effect.

In February, 1922, the rates were made effective for the remainder of the year. The company had lost subscribers, some through local irritation and others due to business depression. Based on the ten months' showing of this year, the company will get about $57,000 revenue, which is less than the commission's estimate of expenditures, plus a fair return, said was necessary.

However, the election of the company to forego certain increases and to postpone improvements, which would have added considerable to annual operating expenses, has resulted in substantial economies in operation, as compared to the estimate.

After paying interest on the small amount of note obligations outstanding, the company has earned a net income available for dividends of 6.8 per cent on the outstanding stock, all of which had been authorized by the commission after careful studies of the property, but with no physical valuation in recent years.

At the rate the company has earned for the first ten months of 1922, the commission says, it will have earned $9,000 in the year for interest and dividends. The property is being well taken care of, as evidenced by the amount spent in maintenance, and there has been added, chiefly at Genoa, $7,000 in improvements. Traffic expenses do not exceed 35 cents per month per station, which indicates economy born of necessity. Commercial expenses, while relatively higher, are substantially less than found originally as not excessive.

Such an emergency exists, the commission found, as warranted the continuation of the rates, as no reason was found for not approving the application.

Thanks, Mr. Wire Chief!

"I certainly appreciate your kindness in keeping TELEPHONY coming to me," writes Erwin Garder, wire chief of the Badger Telephone Co. at Oconomowoc, Wis., in a letter remitting for his subscription. "TELEPHONY is a great journal for telephone men and is getting better all the time."

Nebraska Supreme Court on Guy Wire Anchoring.

In a case just decided by the Nebraska Supreme Court, it is held that where a company secures telephone poles, which it has a right to place in the streets, with guy wires, it is required to use reasonable care to so erect and maintain the wires as not to endanger public travel or the safety of individuals, having in view the probable use of the highway by the public. It added:

"Where an ordinance requires telephone poles to be placed within or adjacent to the curb line of the street, the fact that the curb line and property line of an alley are the same, and that to place the poles adjacent to the curb line would cause crossarms, ordinarily used on telephone poles, to extend over private property, is no justification for the company to set its poles out in the paving 2½ feet from the curb line, for the company may either construct its crossarms to extend from one side of the pole only, or procure from private owners the right or permission for the overhang of crossarms over their property.

"The testimony of experts on electric pole and wire construction—that the poles and wires in the instant case were erected according to the method generally approved by electrical engineers—does not conclude the question of whether or not the placing of the guy wires in the alley, at the place and under the conditions in question, was a dangerous obstruction to public travel, negligently maintained, that being a matter within the range of common knowledge.

"Where a company anchored an uncovered guy wire, which supported a terminal pole carrying five wires, out in the paving of a 20-foot alley, and 2½ feet from the outer edge of such paving, held that the question of whether or not the company was negligent in so doing is for the jury."

Authorizes Continuance of Existing Rates Because of Efficiency.

The Nebraska State Railway Commission declines to penalize economy and efficiency, and has, therefore, entered up an order continuing for another year the existing rate schedules of the Hamilton County Farmers' Telephone Association. This company operates nine exchanges in that county, and serves 2,800 subscribers. It was originally organized by farmers, who extended their operations into practically all of the towns of the county, and is distinguished from most other companies in that it pays no dividends. The company, however, is not entirely philanthropic. It rebates 25 cents a month

to those stockholders who furnish certain other equipment.

When the commission fixed the present rates in April, 1920, it had in mind securing a minimum return of $2,000 a year that the company should earn in addition to the standard stockholder rebate, which is not sufficient in itself to be classed as an adequate return. This the company is privileged to use as it pleases.

During the current year the company earned a surplus of $3,700 above expenses. There was some talk of cutting the rates, but the board of directors advised the commission that they did not believe this should be done as the maintenance requirements of the commission were not meeting all conditions necessary to good service, and that there was not enough money going into the maintenance and depreciation funds. The commission agreed with this conclusion.

In granting a further extension of rates the commission says that the net returns would ordinarily indicate that a cut of ten cents a month in exchange rentals was called for, but that the record of the company discloses a sincere and intelligent effort to keep down costs, and it would follow that to order a reduction at this time would be to penalize economy and discourage efficiency. It, therefore, accepts the judgment of the board of directors, and allows the rates to stand, subject to the usual condition that if circumstances develop of a character to warrant any change, the commission will retain power to make whatever new rates the situation calls for.

The company did business during most of the war time period at old rates, and the average rate increase, as the schedule now stands, is but 17½ per cent above the 1914 figures.

Unified Service In Xenia, Ohio—Increased Rates Upheld.

The physical merger between the Ohio Bell Telephone Co. and the Springfield-Xenia Telephone Co. in Xenia and Greene County, Ohio, was accomplished on December 28.

Two days previous, the state supreme court upheld the increased rates of the Ohio Bell in Xenia. The Ohio Public Utilities Commission had rejected the higher schedule proposed, but an appeal brought by the company resulted in a reversal of the commission's ruling.

There are now more than 4,000 subscribers in Greene County reached by the Bell company—3,000 of whom are reached out of the Xenia exchange and 1,000 out of the other exchanges in the county.

Ohio Supreme Court Upholds Increase Granted by Commission.

Increased telephone rates granted the Lima Telephone & Telegraph Co., of Lima, in November, 1921, by the Ohio Public Utilities Commission, were sustained December 30 by the Ohio Supreme Court.

An appeal protesting the decision of the utilities body was filed by the city, but the court upheld the commission's decision.

The increases granted are in effect at present.

Oregon Commission Says Bell Violates Anti-Trust Law.

A letter was sent under date of December 23 by the Oregon Public Service Commission to the commissions of other states, with the purpose of enlisting their coöperation in securing the enforcement of the Clayton anti-trust law against the American Telephone & Telegraph Co., the Pacific Telephone & Telegraph Co., and the Western Electric Co.

The Oregon commission has taken up the matter with the Interstate Commerce Commission and may bring it before the United States attorney general.

The letter gives a resumé of the research work done by the commission in seeking to bring the Bell companies under the operation of the law.

A. T. & T. Not to Be a Party to South Carolina Rate Case.

The American Telephone & Telegraph Co. is not to be made a party to the Southern Bell rate case in South Carolina. This ruling was made on December 27 by Judge H. A. M. Smith of the United States District Court at Charleston, when he held that it was only necessary for the Southern Bell to prove its assertion that the state statute and rates are unreasonable.

The legal action between the company and the South Carolina Railroad Commission is a result of the act of legislature which sought to materially reduce the increased rates placed in effect by the Bell early in 1921. The law gave the commission power to enforce it; hence, the commission was named as defendant in the company's suit.

A temporary injunction was granted by the federal court against the immediate enforcement of the statute, the company giving bond to protect its subscribers.

The motion asking that the A. T. & T. be made a party to the case in the federal court was brought by the South Carolina Telephone Subscribers' Association, which is contesting the rate advance.

Rehearing Held on Utah Rates—Taken Under Advisement.

Increased rates for the Mountain States Telephone & Telegraph Co. in Utah, which have been pending in some stage or other for more than three years, were again taken under advisement by the Utah Public Utilities Commission, following the hearing in Salt Lake City, December 22.

The rehearing of the case on the protest of Murray City and others was completed and the case submitted after brief arguments made by the complainants and the company.

Ray M. Morris, general commercial engineer for the company, was the final witness called in the case and was on the witness stand the entire day. His testimony covered practically the entire field of the telephone service.

Counsel for the company stressed particularly that the discrimination would be reinstated by reverting to the old flat rate system from the present toll rates installed under the recent order of the commission. It was pointed out that to rescind these tolls would be to again place Salt Lake users in the position of having to pay toll charges for calling to the exchanges of Murray, Holliday and Midvale but that these exchanges would have no tolls to pay for calling to parties on the Salt Lake exchange.

The company took the position that the evidence introduced at the rehearing being largely repetition of the testimony introduced in the original case and that case having been decided upon its merits by the commission, there was no reason why the commission should greatly concern itself with the matter.

The complainants, on the other hand, stressed particularly the company's financial reports to the Interstate Commerce Commission for 1919, 1920 and 1921, which, they contended, showed the company was not only making a dividend of 7 per cent on the capital stock but had also set aside large sums of money as surplus and for meeting extra charges. They contended the report showed the company was not in such dire financial straits as had been represented in the original case which resulted in the company being allowed certain increases.

Pacific Bell Rate Hearings in Washington to Start Next Week.

It is expected that the Washington Department of Public Works will begin taking testimony next week on rates of the Pacific Telephone & Telegraph Co. in Seattle, Tacoma and Spokane.

A three-day hearing was held December 19 to 21 on valuations of telephone plants in the state, and it has been agreed that additional testimony may be introduced at the first rate hearing.

The plans for rate hearings provide that the Pacific Bell shall make its showing in each of the three cities. Then, when the commission engineers and city experts have had an opportunity to study the evidence and prepare their case in opposition, they will put in their testimony.

Wisconsin Company Granted Increased Rate Schedule.

The rate increase proposed by the Eastern Wisconsin Telephone Co., of Chilton, for service in Marytown, was authorized

Here it is!

Note the date of this article announcing the P & H Guaranteed Penetration process of butt-treating cedar poles - perfected by Page & Hill Co.

SEPTEMBER 25, 1920

TELEPHONY

SEPTEMBER 25, 1920

A Revolutionary New Butt-Treatment

Page & Hill Company, of Minneapolis, Develop An Absolutely Guaranteed Penetration Process. This New Butt-Treatment Impregnates The Treated Area Of Every Pole With A Standard Preservative To A Uniform Depth Of One-Half Inch—Effecting An Economy On Replacement Costs Of About Four Poles Per Mile.

By

ALBERT EDWARD RICHTER

the First Public Announcement of the Only Guaranteed Penetration Process,

—the "P & H"

PAGE & HILL CO. was the first to brand their poles - the first to develop a process of butt-treatment that insured a one half inch penetration of the preservative throughout the ground-line area of the pole - the first to issue *a written guarantee* specifying a definite depth of butt-treatment.

The "P & H" is the *original* Guaranteed Penetration Process - *and is still the best.* We guarantee, *in writing,* a half inch uniform penetration of the preservative throughout the ground-line area.

We produce and sell treated and untreated Northern White and Western Red Cedar Poles - we can give you any form of butt-treatment. We make prompt shipments because of the strategic location of our yards throughout the North Central and Western States.

Write for illustrated booklet of facts on the butt-treatment of cedar poles.

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PAGE AND HILL CO.

MINNEAPOLIS, MINN.

MAIN YARDS AND BUTT-TREATING PLANTS - ST. PAUL, MINNESOTA (Minnesota Transfer)

New York, N. Y. 50 Church St. | Kansas City, Mo. 717 Bryant Bldg. | Houston, Texas, 1111 Carter Bldg. | Buffalo, N. Y. 950 Ellicot Sq. Bldg.
Chicago, Ill., 19 So. LaSalle St. | Omaha, Neb., 513 Electric Bldg. | Dallas, Texas, 311 Sumpter Bldg. | Louisville, Ky. 1416 Starks Bldg.

by the Wisconsin Railroad Commission on December 30 and went into effect January 1. It appeared that even with the increase the revenue for 1923 would not be adequate to care for the estimated expenses.

The new rates entitle the Marytown subscribers to free service with the subscribers of the Johnsburg exchange. The latter has between 175 and 200 patrons, exclusive of those connected at Marytown.

Damage caused by the sleet storms early last year necessitated rebuilding in the vicinity of Marytown. The company did not wish to restore the grounded circuits on account of service conditions; instead it offered to build a full metallic circuit to the exchange chosen by the majority of subscribers. Johnsburg was chosen and the circuit was built from Marytown to Johnsburg.

The company's records show an investment of $1,502 for the Marytown exchange—or about $52 per station. The statement for 1922 showed expenses of $13.25 per telephone, excluding depreciation, which was not out of line with those of other small exchanges. The estimated requirements amounted to an average rate of $20.65 per telephone.

The old and new schedules are:

	Old rate.	New rate.
Business	$1.25	$1.50
Residence	1.00	1.25
Rural	1.00	1.25

New Toll Schedule Given Company to Avoid Discrimination.

That there may be no discrimination between the exchanges of the Marion & Northern Telephone Co., of Marion, the Wisconsin Railroad Commission on December 30 gave the company authority to place a new toll schedule in effect January 1. In some instances the rates are increased and in others they are decreased.

An advance of 25 per cent in the station-to-station rate, a report charge of 25 per cent of the station-to-station call, and overtime charges and other regulations of the standard schedules of the Wisconsin Telephone Co. were authorized at the same time.

Madison, Wis., Company to Issue $20,000 Capital Stock.

Authority to issue $20,000 of its capital stock was given the Commonwealth Telephone Co., of Madison, by the Wisconsin Railroad Commission. The order was entered December 30, becoming effective as soon as it is recorded on the books of the company. The issue is divided into 200 shares of the par value of $100 each.

The purpose of the issue is to secure funds with which to reimburse the treasury for expenditures heretofore made for additions, extensions and improvements to its property and plant.

Summary of Commission Rulings and Schedule of Hearings.

ALABAMA.

January 2: Hearing on application of the Roanoke Telephone Co., of Roanoke, for authority to discontinue certain lines, continued from this date to February 5.

CALIFORNIA.

December 27: Authority given Associated Telephone Co., of Long Beach, to sell $200,000 par value of its common capital stock to finance extensions and betterments to its properties.

December 27: Application filed by Dalidio, Tognini & Chezzi Telephone Co. for permission to sell to J. R. Fort its business and property in the town of Cayucos, at an agreed price of $1,000.

December 28: Petition filed by William Cromlie, owner of a telephone system in Kings County, with its principal office in Corcoran, for authority to transfer the business to the Corcoran Telephone Exchange, of which he is president. With the exception of three qualifying shares, the petitioner will hold all stock of the corporation, amounting to $25,000 par value. The reason given for the proposed transfer is to separate public utility business from applicant's private business and to make it easier to procure funds for development work.

January 2: Application for increased rates filed by Morgan Hill Telephone Co., in order that it may be in a position to give all night service. The commission is asked to appraise the property and establish fair rates.

January 4: Authority given Santa Barbara Telephone Co., of Santa Barbara, to issue and sell at not less than 87½ per cent of their face value and accrued interest $60,000 of its first mortgage, 5 per cent, 30-year, sinking fund, gold bonds.

ILLINOIS.

January 5: Approval given to the merger of the Kinloch Telephone Co. of St. Clair County with the Illinois Bell Telephone Co., provided that there be no increase in rates for at least a year.

January 9: Hearing held at Chicago on citation to the Illinois Bell Telephone Co. to show why rates for service in Chicago and adjacent territory should not be reduced.

January 9: Hearing held at Chicago on citation to Illinois Bell Telephone Co. to show why rates for service in the counties of Cook (except Chicago), DuPage, Grundy, Kane, Kendall, Lake, McHenry, and Will should not be reduced.

MICHIGAN.

December 27: Approval given to merger of exchanges of Michigan State Telephone Co. and Home Telephone Co. at Dowagiac and throughout Cass County.

KANSAS.

January 3: Application of Emporia Telephone Co. to reduce rates on rural lines from $1 a month to 75 cents a month, approved. The rural lines are owned by the subscribers and the company merely rents the instruments. The reduction is said to apply to about 1,000 farm telephones.

MISSOURI.

December 22: Southwestern Bell Telephone Co. authorized to continue existing rates at its St. Louis exchange for the temporary period ending April 1.

December 22: Order entered permitting DeKalb County Telephone Co., of Maysville, to continue using rates granted October 18, 1920, for its exchanges at Maysville, Fairport, Amity and other towns mentioned.

NEBRASKA.

January 4: Application by Platte Valley Telephone Co. for interpretation of rule regarding amount to be charged for inside moves when workmen must be sent from other towns.

January 4: In the matter of the application of the Beaver City Telephone Co. for fixing switching rate at Edison exchange; request reasonable and granted.

January 11: Hearing at Cozad of application of Cozad Mutual Telephone Co. for an increase in rates.

January 5: Complaint filed by the Bank of Phillips against Hamilton County Farmers Telephone Association because of elimination of flat rate from Phillips to Grand Island.

January 6: Application of the Lincoln Telephone & Telegraph Co. for permission to issue $500,000 of common stock; found to be reasonable and granted upon condition that detailed reports of proceeds of sale and expenditures be made whenever the amount of the latter reaches 10 per cent; stock to be sold for cash or its equivalent at par.

NORTH DAKOTA.

December 23: Petition filed by Grafton Rural Telephone Co., of Grafton, for decrease in switching rates of the Northwestern Bell Telephone Co.

December 27: Authority granted Danzig Telephone Exchange, of Danzig, to shorten hours of service from December to April, there being only one protest to the petition.

December 28: The service station switching charges of the Park River Telephone Co., of Park River, being under investigation, a rate of $4.80 per year per station has been ordered.

OHIO.

February 13: Hearing on application of Ohio Bell Telephone Co. for authority to unify the service in Massillon, continued to this date.

TENNESSEE.

December 28: Cumberland Telephone & Telegraph Co. granted temporary rate increase pending final determination of case. Final hearing set for March 5.

UTAH.

December 22: Rehearing held at Salt Lake City on new rate schedule granted the Mountain States Telephone & Telegraph Co. last July for service in various Utah cities. Matter taken under advisement.

WASHINGTON.

January 15: Hearings on rates of Pacific Telephone & Telegraph Co. for service in Seattle, Tacoma, and Spokane, scheduled to begin this week.

WISCONSIN.

December 30: Commonwealth Telephone Co., of Madison, authorized to issue $20,000 of its capital stock, divided into 200 shares of the par value of $100 each. The issue is for the purpose of securing funds to reimburse the treasury for expenditures heretofore made for extensions and improvements.

December 30: Rate increase granted Eastern Wisconsin Telephone Co., of Chilton, for service in Marytown; effective January 1.

December 30: Permission granted the Rock Falls & Meridian Telephone Co., of Rock Falls, to issue $760 par value of its capital stock, consisting of 19 shares of the par value of $40 each, in exchange for certain telephone property described in the application.

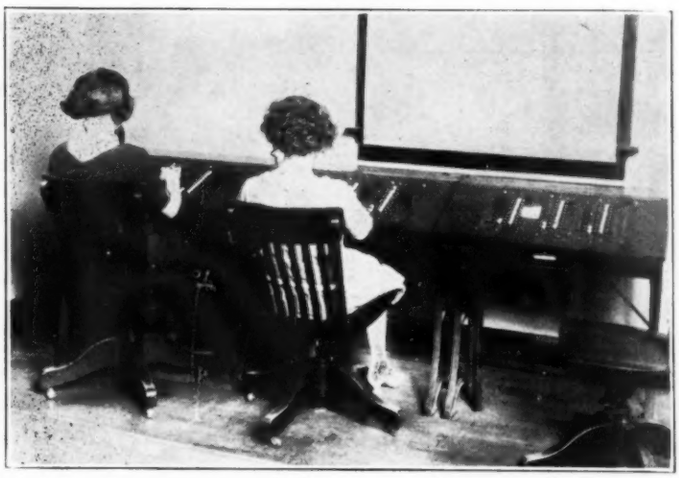
December 30: Marion & Northern Telephone Co., of Marion, given permission to establish new toll rates between its various exchanges.

A Satisfied *and* Enthusiastic Public *and a* Prosperous Operating Company

Are the Certain Results of a Combination of

Automanual Equipment *and* Good Management

The Automanual Exchange of the Wapakoneta Telephone Company, Wapakoneta, Ohio, is one illustration of the truth of this assertion.



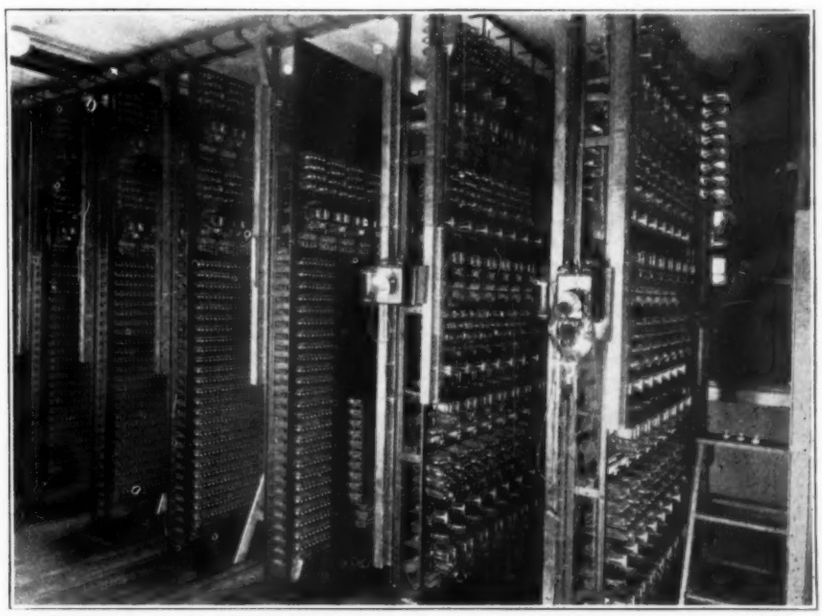
THESE **2 Automanual Operators** take care of the busy hour traffic for 1,800 stations in the Wapakoneta, Ohio, exchange where the **Automanual service provides 2½ seconds answering time, reduces errors to less than 1% and includes automatic ringing, secret service, instantaneous disconnect and immediate recall.**

Except during the busy hours, **1 AUTOMANUAL OPERATOR** switches the local traffic for the 1,800 stations.

At night **1 OPERATOR, ALONE,** WORKING AT **AN AUTOMANUAL TOLL BOARD,** handles the entire traffic—both local and toll.

THIS shows the **AUTOMANUAL SWITCHING EQUIPMENT** which makes possible such **EXCELLENT SERVICE** at Wapakoneta as to create **AN IDEAL RELATIONSHIP BETWEEN THE PUBLIC AND THE OPERATING TELEPHONE COMPANY.**

What **AUTOMANUAL** has done for Wapakoneta, it will do for you; let us explain it.



AUTOMANUAL REMOTE CONTROLLED and DIAL CONTROLLED

MACHINE SWITCHING SYSTEMS

The North Electric Manufacturing Company, Galion, Ohio

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Personal and Biographical Notes

Paul M. Lincoln has been made director of the school of electrical engineering at Cornell University, to succeed Professor Alexander Gray, deceased.

Mr. Lincoln brings to his new position a practical engineering experience of nearly 30 years, wide connections in the engineering world, and an abundance of tact, sound judgment, optimism, and human sympathy, by which he has made and held a vast number of friends.

He was born in Norwood, Mich., spent his boyhood and high school days in Painsville, Ohio, and studied for a year at the Western Reserve University in Cleveland. He became convinced that his leaning was not toward a classical education, so he entered the Ohio State University in 1889 and received his M. E. in E. E. degree in June, 1892.

His first work after graduation was with the Short Electric Co., of Cleveland. Later, he went to Pittsburgh, Pa., to take up work for the Westinghouse Electric & Mfg. Co. After about two years with that concern, he became connected with the Niagara Falls Power Co., of Niagara Falls, N. Y., as its electrical superintendent.

Returning to the Westinghouse company in 1902, he remained until 1919, when he joined the forces of the Lincoln Electric Co., which his older brother had organized. He continued with this company until November 1, when he took up his duties as director of the engineering school at Cornell.

Mr. Lincoln has for many years taken an active interest in the affairs of the American Institute of Electrical Engineers. For five consecutive years—1909 to 1914—he served as chairman of the sections committee, and was president of the institute in 1914-1915.

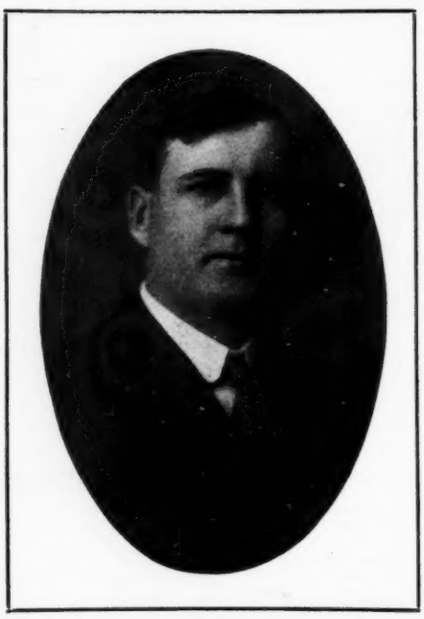
W. G. Bickelhaupt, of Aberdeen, S. D., has been elected president of the Dakota Central Telephone Co. to fill the vacancy caused by the death of J. L. W. Zietlow. With the assumption of his new duties as executive officer, Mr. Bickelhaupt relinquishes the office of secretary-treasurer, which he has held since the organization of the Western Dakota Telephone Co., the predecessor of the Dakota Central. B. C. Lamont succeeds him as secretary and E. E. Ingham as treasurer.

Mr. Bickelhaupt was also one of the organizers and directors of the Dakota Central Lines, which was taken over by the present company in 1904.

Joining forces with Mr. Zietlow in 1898 to give South Dakota an extensive Independent telephone service, Mr. Bickelhaupt gave his earnest coöperation to the building of the system that is now one of the largest Independent companies in the country.

Mr. Bickelhaupt was born in Cambria, Wis., in 1865. He assumed heavy business responsibilities at the age of 19, when his father died and left him the management of a grain business. For several years his activities were along this line, including operations in South Dakota and Washington.

His more than 20 years' experience as



W. G. Bickelhaupt, of Aberdeen, S. D., for Many Years Secretary-Treasurer of the Dakota Central Telephone Co., Is Its New President.

partner in developing a broad telephone service has given Mr. Bickelhaupt an especial fitness to carry on the policies of the Dakota Central Telephone Co. and its continued progress under his guidance is assured.

He is a member of the Aberdeen Commercial Club, York and Scottish Rite Masons, Mystic Shrine, Modern Woodmen and United Workmen.

A. S. Little, after two years as manager of the Northwestern Bell Telephone Co. at Dubuque, Iowa, has been placed in charge of the company's affairs at Des Moines, the change becoming effective December 15. He has been connected with the Bell system for four years .

Mr. Little was born in Elmira, N. Y., graduated from high school in Candor, N. Y., attended the University of Buffalo for one year, and graduated in 1915 from the Ohio State University as a pharmaceutical chemist.

During his regime as manager of the Dubuque office, Mr. Little took a prominent part in the civic and social activities of the city and made many friends. He is well known as a clubman, an athlete and a musician. He played the coronet in the community band, acted as an official in a great number of football games, and managed two local football teams with much credit.

Mr. Little is a member of the Rotary Club, Chamber of Commerce and Junior Chamber of Commerce.

L. M. Holliday, assistant to President Belt of the Northwestern Bell at Omaha, Neb., has been promoted to the position of general commercial agent of the Omaha exchange. **Matthew Pond,** local manager at Lyons, Neb., has been made area manager at Fremont. **M. W. Ricker,** division traffic supervisor, has been made district traffic chief at Waterloo, Iowa.

T. B. Baird, formerly district manager of the Cumberland Telephone & Telegraph Co. at New Orleans, La., has been transferred to the district managership of the Southern Bell Telephone & Telegraph Co., at Birmingham, Ala.

J. C. Hay has been named as district manager of the Cumberland Telephone & Telegraph Co., with headquarters in New Orleans, La. He has been commercial supervisor of the company for some time and now succeeds T. B. Baird, who was transferred to Birmingham, Ala.

Mr. Hay began his career in the telephone industry 25 years ago, serving as operator, lineman, foreman, manager, district manager, special agent, and commercial supervisor.

He has been a resident of New Orleans for nine years and is prominently identified with the commercial activities of the city. He is a director of the Rotary Club and a member of several other civic organizations.

W. R. Driver, Jr., was named as vice-president in charge of general operations at a recent meeting of the directors of the New England Telephone & Telegraph Co. Mr. Driver was vice-president and general manager, but owing to the growth of the company it was found necessary to divide the duties of supervision.

In addition to having general charge of operation. Mr. Driver takes over the general direction of relations with sublicense companies. The change became effective December 1.

George K. Dresser, formerly general superintendent of plant, has been made general manager of the New England Telephone & Telegraph Co., in line with the decision at the recent directors' meeting to divide the burden of management.

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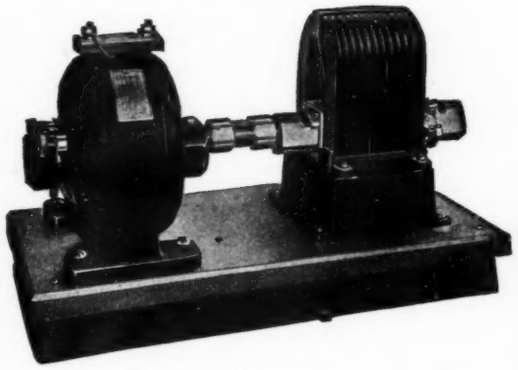

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—saves one operation in soldering

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KESTER ACID CORE WIRE SOLDER

It's self fluxing. The flux is right in the solder. It's contained in pockets in the hollow wire of genuine tin-and-lead solder, and when heat is applied, it flows out on the job just before the solder melts.

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Mr. Dresser assumed his new responsibilities December 1, relieving W. R. Driver of the immediate direction of operations so that he might be able to attend to the more general affairs of the company.

J. A. Sullivan, for several years district manager of the Cumberland Telephone & Telegraph Co., with headquarters at Frankfort, Ky., has been named as general manager of the Fayette Home Telephone Co., of Fayette, Ky. He succeeds M. S. Taylor, who resigned.

Mr. Sullivan has been in the telephone business 33 years, has had headquarters at Frankfort continuously for 20 years, and is widely known in Frankfort and Lexington. About 25 years ago he was manager of the Lexington exchange of the Bell company.

H. E. McAfee, of Denver, Colo., general commercial manager of the Mountain States Telephone & Telegraph Co., has been made assistant vice-president in charge of operations. He will supervise traffic and plant work throughout the company's territory.

Obituary.

Mrs. Mabel Hubbard Bell, widow of Alexander Graham Bell, inventor of the telephone, died January 3 at the residence of her daughter, Mrs. Daniel Fairchild, at Chevy Chase, Md., near Washington. Mrs. Bell never recovered from the shock of her husband's death last August.

Mrs. Bell is survived by two daughters, Mrs. Elsie May Grosvenor, wife of Dr. Gilbert Grosvenor, president of the National Geographic Society, and Mrs. Marian Hubbard Fairchild, wife of Dr. David Fairchild, an official of a scientific branch of the Department of Agriculture.

Mrs. Bell was born in Cambridge, Mass., November 25, 1859, the daughter of Gardiner Green Hubbard. Her pedigree was aristocratic, and she traced her ancestry to King Edward I. When three years old she suffered from a severe attack of scarlet fever which left her completely deaf. Through the persistent efforts of her mother she was able when six years old to use speech and read the lips so well that she could understand what was said to her by her friends and was understood by them.

The romance between the distinguished inventor of the telephone and Miss Hubbard was due to her affliction. In November, 1874, she went to a private training school in Boston, maintained by Alexander Graham Bell, to have her voice benefited by his method of voice culture. Mr. Bell met Miss Hubbard frequently at the home of her parents and fell in love with her.

Out of their romance, it was said, grew Mr. Bell's inspiration to invent the telephone. His hope that he might find a means of enabling her to hear led to experiments in the realm of phonetics, and this resulted in Mr. Bell's great discovery and invention.

The experiments were financed largely by her father, who became the organizer and first president of the Bell Telephone Co. After the invention was recognized by the world, Mr. Bell and Miss Hubbard were married. They made their home in Washington in the winter of 1878-9.

Out of Mrs. Bell's loss of hearing grew other notable advances in the scientific world. It was Mr. Hubbard, her father, who demonstrated the futility of the contention that deaf children could be taught only by the use of sign language. He arranged a demonstration in lip reading and speech by his little daughter for the benefit of a legislative committee of Massachusetts. The legislators were so impressed by her ability to speak and understand what was said, though deaf, that a charter was granted for the now well-known Clarke School at Northampton, Mass.

All this is related in a little book that Mrs. Bell wrote for presentation to the members who attended the meeting in Washington of the National Education Association: "The Story of the Rise of Oral Method in America as Told in the Writings of the Late Honorable Gardiner Green Hubbard." Today every deaf child in America can be taught to speak and read the lips.

Mrs. Bell has contributed articles to perodicals and has written several plays. She traveled around the world with Dr. Bell and temporarily dwelt in many strange lands.

Mrs. Bell's faith in her husband's genius was boundless. She encouraged all his efforts, and contributed large sums to defray the cost of his experiments in many and varied fields.

Dr. Bell often said that had it not been for the insistence of Miss Hubbard, the now famous tests of his electric-speaking telephone at the Centennial in 1876 might never have taken place. It was those tests made by scientists that aroused the world to the greatness of the invention.

How he happened to attend the exhibition is told by H. N. Casson in "The History of the Telephone." He had no intention of going, but one Friday afternoon in June, 1876, he went to the depot to say good-bye to Mabel Hubbard—then his sweetheart—who was taking the train for the Centennial.

She had supposed that he was going and was keenly disappointed when she learned that he was not. She was very fond of him—and, perhaps, too, it was one of those "womanly intuitions," that told her he should go.

When the train was pulling out and she saw him standing on the platform she was so overcome that she wept. The young man impulsively ran after the moving train and sprang aboard, with never a thought about ticket or other prosaic matters.

This unplanned trip to Philadelphia proved to be one of the most fortunate acts in Bell's life. The judges were to inspect certain exhibits on a Sunday afternoon and Mr. Hubbard, after much trouble, secured their promise to give a few minutes to the Bell telephone.

The dramatic story of his recognition is common property but this instance of Mrs. Bell's influence and how he got started on the road to fame is not so widely known.

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